MARCH
1960

FOUNDRY

A PENTON PUBLICATION

STEEL FOUNDERS PROMOTE

...sinews of

modern living

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Circle 551 on Page 53

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Circle 564 on Page 53

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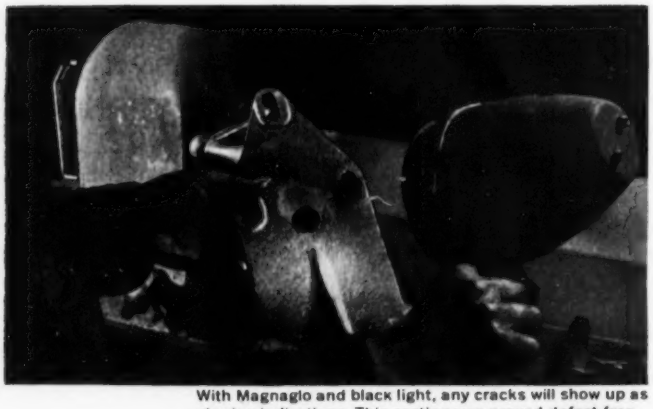

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March 1960
Volume 88—Number 3

FOUNDRY
A PENTON PUBLICATION

This crystal bar of chromium might well be taken for a jewel-studded royal scepter. It is being inspected by Dr. John M. Blocher Jr. of Battelle Memorial Institute, which prepared the specimen. It is in the purest form now available, 99.99+ per cent pure, and is known as Iochrome.

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Recent Advances in Steelmaking Practices . . 108
Rodman Laboratory of Watertown Arsenal has done extensive process evaluation of slag and metal characteristics and their effects on chemical and physical properties of cast low alloy steels—By JOHN ZOTOS

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Foundryman Markets an Idea 150
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Man to Man 153
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FOUNDRY is edited primarily for management, production, technical, and purchasing personnel in foundries. A copy is sent at no cost to each metal casting plant in the U. S. and Canada employing 20 or more workers and to selected smaller foundries. Additional copies are sent to each foundry to the extent necessary to serve all key foundry personnel on a personal or routed basis. A limited number of copies is supplied at no cost to educational institutions. Subscriptions in the U. S., possessions, and Canada for home-addressed copies and copies not qualified for under the above principles: One year, $10. Single copy, $1. Other countries: One year, $20. Single copy, $2. Published monthly by The Penton Publishing Co., Penton Building, Cleveland 13, Ohio. Accepted at controlled circulation publication at Cleveland, Ohio.

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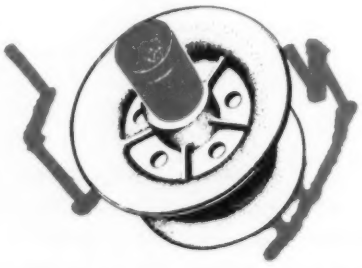
THE EDITORS' WORKSHOP

CHUBBY CHERUBS: The fat little fellows shown here astride a set of plumbing fixtures are typical of hardware castings produced at the

Ralph DuBois foundry, Tulsa, Okla. The DuBois shop stocks 9000 patterns to produce its yellow brass ornamental hardware castings. The full story is on Page 150.

AHEAD: Other articles that the editors are working on for presentation in the months ahead will cover varied and interesting subjects. They will treat such topics as shell mold sand, melting and casting of aluminum bronze, metallurgy and heat treatment of iron castings, application of high-quality steel castings to aircraft, and production of pearlitic malleable iron.

GATING AND RISERING: With this issue, we mark the end of the first six months of our gating and risering series, for which the drawing reproduced here is the symbol on each article. Next month, the series moves to aluminum, and subsequent articles will cover other metals as well as special processes. The current article in the series is "Risering of Ductile Iron Castings," by R. W. White, International Nickel Co. It's on Page 96.



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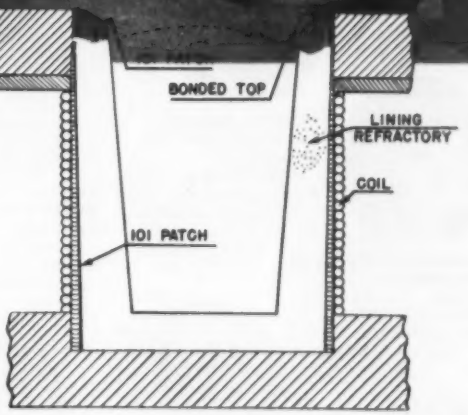

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Preston Carter and a mountain of confidence

R. Preston Carter is a typical Alcoa salesman. Our picture shows him leaning on a stack of aluminum pig, confident that he will always be able to depend upon Alcoa to meet his customers' pig and ingot needs.

We've called the stack of pig a "mountain" because that's the impression we always get when we walk among such stacks at any of Alcoa's many producing locations, where "mountains" like this are constantly being built and torn down again for shipment. And, as "Pres" will tell you, Alcoa, the world's largest producer of primary aluminum, has more smelting facilities under construction than any other basic producer.

A 25-year veteran with Alcoa, Pres knows his company shares his faith in the market for primary aluminum and is keeping pace with the requirements of an expanding economy.

Pres' knowledge of the light-metal foundry and extrusion industries is as much a part of him as his mustache. He's watched them grow, fostered their ambitions. As a metallurgist with experience in several of Alcoa's plants, he has confidence in his product and is convinced that Alcoa's quality control leads that of all the other smelters. Pres knows Alcoa will always back him up with a better product and more of it, better delivery and more experienced technical assistance than his competitors can provide.

As a continuing source for aluminum pig and ingot, Alcoa, the company with more faith in the market, is your soundest choice. Just call your local Alcoa sales office (you'll find it under "Aluminum" in the Yellow Pages of your telephone directory).

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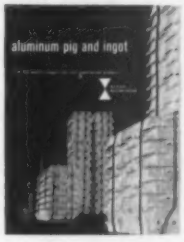

This new 12-page booklet lists all grades and alloys available in pig, ingot and billet form, together with their composition and properties. It also describes the services and technical assistance available from Alcoa's metallurgical staff, the most experienced and unbiased in the industry. Write today: Aluminum Company of America, 2115-C Alcoa Building, Pittsburgh 19, Pa.

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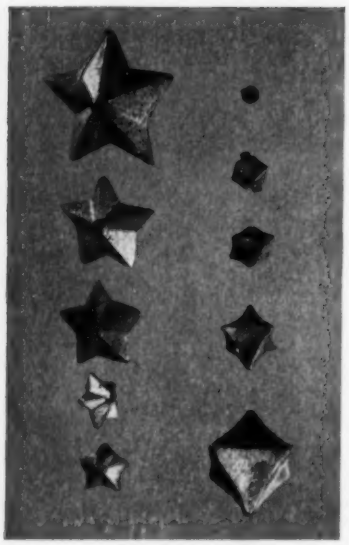

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Once you have cleaned castings with Abmet stars YOU WON'T USE ANYTHING ELSE!

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Circle 559 on Page 53

With the Editors

IN A BRASS FOUNDRY: Emil George Soeth of the E. G. Soeth Brass Foundry, 829 27th Avenue, Oakland 1, Calif., recently sent me a 42-page booklet entitled "Personal Foundry Experiences or Thirty Years in a Brass Foundry." The text is a combination of the author's philosophy and practical know-how in the production of castings, and should prove quite interesting to many engaged in similar occupations.

In the opening statement, the author expresses the hope that "by explaining a few things about the brass foundry operations there may be a better understanding between foundrymen and users of brass castings." To prepare the customer for problems, he warns that "foundry operations are about the most risky of any manufacturing operation that I know of."

In telling of his early experiences in selling castings, Mr. Soeth points to the principles which contributed to his success. First, he became thoroughly familiar with his product and the customer's requirements. He did not try to sell the customer what he had, but was willing to produce what the user needed and wanted. Secondly, he always treated customers as friends, and not as though the only interest was in how much money he could make out of their business.

The author also comments on experiences in making bushings and bearings, how every casting producer takes the blame for the shortcomings of other foundries, relationships in the industry, the problems of patterns, methods of refining metals, physical properties of castings, foundry hazards, unfair practices, and the value of technical knowledge in reducing losses.

Copies of this interesting reminiscence can be obtained from the author for $1.

—o—

The 1952 AFS Show: The Atlantic City Convention Bureau recently distributed a beautiful folder entitled "The NEW Atlantic City Convention Hall." A publicity release accompanying the folder points out, "In addition to increasing the space available for exhibits and meetings, the mammoth building has been made more attractive both inside and out through a multi-million dollar face lifting job, including an ultra-modern Boardwalk front with inviting entrances, a completely redesigned main lobby, and an all-weather vehicular tunnel approach and two-way escalators serving all three levels." Other improvements are listed.

The thing that interested me most about this folder was the fact that the bureau selected a beautiful colored shot of the 1952 AFS Foundry Show to decorate the inside cover of the booklet. If you will recall, that was one of the most colorful of AFS shows, and the view from the balcony at Atlantic City was terrific.

—o—

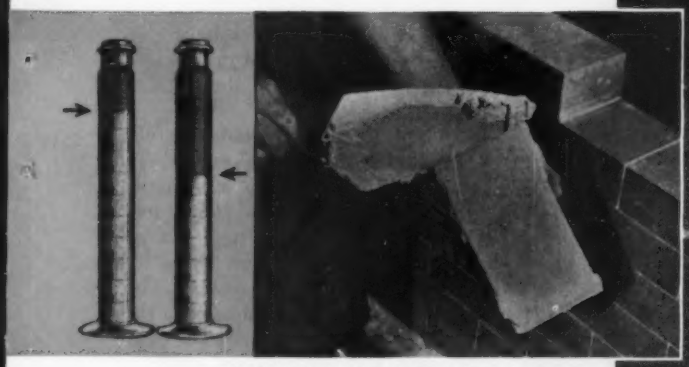
What Is an Editor: Ever wonder what a business paper editor is like? Here is one idea of an editor suggested recently by R. O. Eastman of the Eastman Research Organization Inc., New York, in a news letter:

"There are certain peculiarities about the business paper editor and his job that have helped to make this work of ours effective. In the first place, he is rarely if ever a professional editor. He inhabits no ivory tower. He has no illusions of editorial genius. He knows more about the trade or industry he serves than he does about the job of editing a magazine. He associates more with the people in that industry or trade or profession than he does with those of his craft."

Roy Eastman should know something about editors. He has spent many years directing editorial research to help business papers to do a better job and for several years served FOUNDRY in that capacity. FOUNDRY editors hope they measure up to these specifications.

—o—

Opens Holly House: Last fall, the New Jersey Silica Sand Co. dedicated a new Holly House on its property at Millville, N. J. The house



1. Settling test (as shown) demonstrates that ANKORITE 65 remains longer in suspension, a valuable characteristic of a hot-setting mortar. ANKORITE 65 in the graduate on the left, shows no settling, while ordinary mortar in the other tube has settled considerably in the same time.
2. ANKORITE 65 spreads smoothly and well, making uniform joints of the thickness desired.
3. View of malleable furnace wall of high-quality super-duty fireclay brick laid with ANKORITE 65. The unusual resistance of this mortar to severe slagging action and erosion is illustrated by the joints which extend beyond the brick.

Harbison-Walker Ankorite 65

The new WIDELY-USED bonding mortar • more refractory • more workable • more durable • for super-duty and high-alumina brick

The protruding mortar joints of the furnace wall in the photograph illustrate the exceptional durability of ANKORITE 65. This shows a portion of a malleable furnace wall of high-quality super-duty fireclay brick laid with this mortar. As is obvious, after the normal period of service, the mortar has been less eroded than the brick.

ANKORITE 65 is a high-alumina heat-setting mortar which develops a strong ceramic bond of high resistance to slag corrosion and to severe erosion of metal and slag at high temperatures.

ANKORITE 65 is used with splendid results for laying bottom blocks and linings of blast furnaces up to the mantle. It is particularly suited for laying various alumina-silica brick linings of transfer ladles, for electric furnace roofs, and for malleable and air furnace side walls and bottoms. The good workability of this mortar lends itself to easy trowelling or dipping in securing strong impervious joints. In some applications it is used with benefit for protective coatings by spraying or brushing.

The Garber Research Center

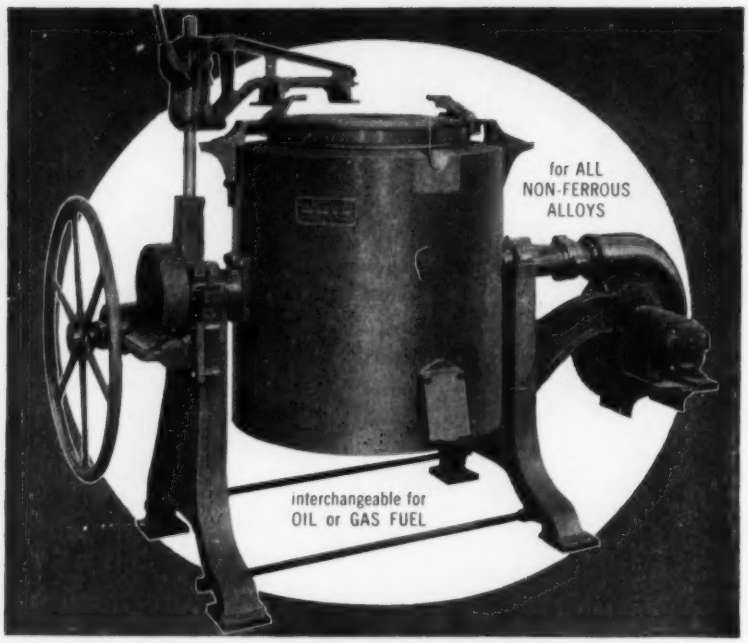
Leadership in refractories through constant research

Harbison-Walker Refractories Company

AND SUBSIDIARIES *World's Most Complete Refractories Service*

GENERAL OFFICES: PITTSBURGH 22, PENNSYLVANIA

Circle 560 on Page 53



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- trouble-free tilt . . . *holds* in any position
- heavy duty cast iron trunnions surrounded by roller bearings
- precision-machined throughout
- arrives factory-assembled, factory-tested to operating temperature
- exclusive Hausfeld swing-top compensates for various size top covers

With crucible sizes from #40 to #400, there is a Hausfeld Tilting Furnace to help you boost your plant's efficiency. Write for full details today.

THE CAMPBELL-HAUSFELD CO.,
300-O Moore St., Harrison, Ohio

CAMPBELL-HAUSFELD
METAL MELTING FURNACES

is situated in a holly orchard that is said to be the largest private collection of hollies in the United States.

A little folder, distributed to visitors at Holly House, points out that hollies belong to a versatile group of plants which have red, white, yellow, and black fruit as well as many different types of leaves and number of spines. The purpose of the landscaping at the new house is to familiarize the public with the various uses of holly in the landscape pattern.

Foundrymen and their families brought attendance at the dedication ceremonies to over 500. In addition to seeing the new house, visitors were shown how to use holly for Christmas decorations, and were given a tour of the holly orchard and the sand plant.

A stainless steel placque, cast by Lebanon Steel Foundry, Lebanon, Pa., was presented to C. Franklin Wolf, vice president and sales manager of New Jersey Silica Sand Co., by Charles Mease, treasurer of Lebanon.

—o—

Craftsmen: The letter from Dean C. J. Freund of the University of Detroit, who is now in Pakistan, as mentioned in this column in February, has another interesting comment that I would like to pass along:

"Illiterate Pakistan craftsmen have the reputation of being able to reproduce anything you show them, even if they are not so smart about devising anything new. A surgeon in the United Christian Hospital here had an instrument somewhat like a scissors, with two elements held together by a small bolt at the joint. It was no longer serviceable because the threads in the bolt had become badly worn. The surgeon took the thing to an instrument maker at Sialcot and told him to make a new one just like the old. In due time—six or eight months, probably—the artisan delivered the new instrument. It was indeed just like the old one. He had even reproduced the precise amount of wear on the connecting bolt."

Some of the service people in our country appear to have the same general philosophy.

F.G.S.

Circle 561 on Page 53

I'm *Soffel's* Red Devil Thermotomic HoTop

I'll pump all the metal you can pour... 24 hours a day... the hotter—the better!

A demonstration will show you how effectively you can cut costs & increase yields

Reduce the size of your heads and let Soffel's Red Devil Thermotomic Hotop keep that reduced amount of metal in the heads liquid so you will gain *more* sound, shrink-free castings from every ladle of metal poured.

Soffel's Red Devil Thermotomic Hotop will *not* contaminate any non-ferrous alloy, is *not* premium priced, requires *no* special engineering personnel, definitely *will* reduce costs and increase yield. Ask for demonstration today.

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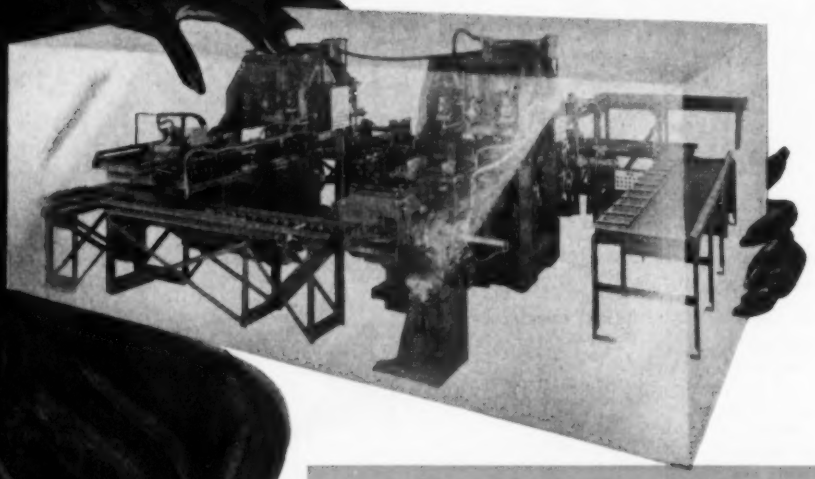
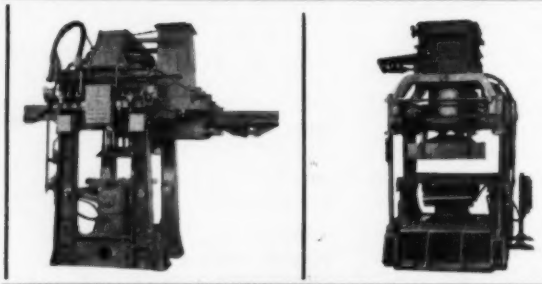
"WORLD'S LARGEST MANUFACTURER OF FLUXES, PURIFIERS AND EXOTHERMIC COMPOUNDS FOR ALL METALS AND ALLOYS"

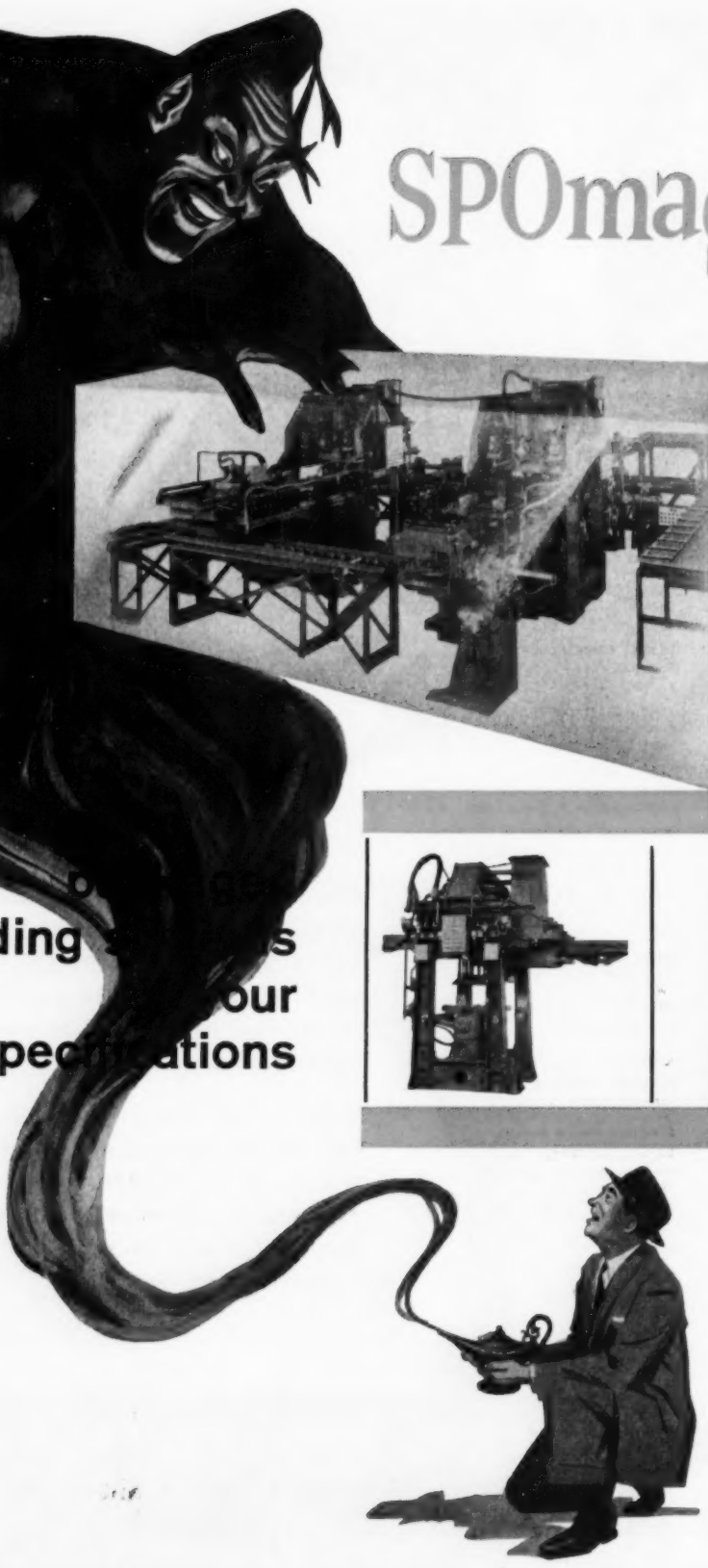
Circle 562 on Page 53

SPOmagic...



molding
our
specifications





SPO DESIGNS, ENGINEERS AND PRODUCES VERSATILE "CUSTOM" CAPABILITIES FROM STANDARDIZED MACHINES AND COMPONENTS

In today's fast-paced competitive foundry market, the molding equipment with the greatest inherent versatility will pay the highest long-term dividends in performance and profits. This fact-of-life applies to repetitive high-production foundries as well as jobbing operations.

DO YOU REALLY NEED SPECIAL MACHINES?

The recent advent of *limited function molding machines* . . . such as those without a jolt cycle . . . raises the question of the economic feasibility of special-purpose machines in molding systems. Some molds do not require jolting. And foundries specializing in this type of mold can use joltless designs effectively.

But . . . the real problem with limited function machines lies in a foundry's *long-range needs.* If both jolted and non-jolted molds must be made in the same facility, it would seem the foundry theoretically could utilize both types of molding machines. This condition, however, would require an *unnecessary increase in capital investment without a compensating increase in versatility!* SPO has solved this problem by a new and advanced squeeze head design.

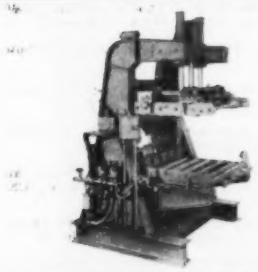
SPO OFFERS MULTI-FUNCTION STANDARD DESIGNS

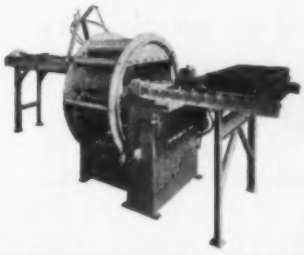
To eliminate duplication of equipment, SPO has developed a *new Compensating Squeeze Head design that permits the jolt cycle to be locked out when not required,* but has it available as soon as jolting is needed. In one standard machine, for one initial investment, SPO provides the versatility to produce every type of mold. This practical approach typifies SPOMAGIC . . . creative engineering for efficient low-cost foundry molding operations.

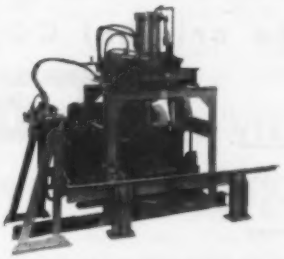
PACKAGED SYSTEMS FROM PRE-ENGINEERED UNITS

This same design and methods awareness is utilized in SPO-engineered molding systems. Using standardized machines and auxiliary equipment, SPO can develop "packaged" systems to meet every specific requirement. And, if necessary, SPO can design, engineer and fabricate special ancillary equipment to support the basic system. As the world's largest supplier of molding machines, SPO also is the best qualified to help you analyze and solve your molding problems. No other company can show you as many "tailored" automatic systems in operation today . . . or offer you broader experience in molding methods.

WRITE OR CALL FOR ADDITIONAL INFORMATION.







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ONLY SPO OFFERS THIS RANGE OF AUTOMATED SYSTEMS COMPONENTS AND SERVICES

1. Flask Fillers
2. Automatic Core Setters
3. Automatic Cope Closers
4. Automatic Weight Setters
5. Automatic Flask Separators
6. Automatic Jolt-Shake Outs
7. Automatic Flask Handling Systems
8. Complete Engineering Services for any molding problem
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BEST QUALITY Steinex gives you absolutely the best shakeout —BY FAR!

BEST PRICE Steinex is 30% lower in cost than any other binder on the market!

BEST SERVICE Carver has the in-the-foundry experience and know-how to help you use Steinex in your CO_2 operation — successfully and profitably!

JOIN THE HUNDREDS OF FOUNDRIES THAT INSIST ON THE BEST

MAIL TODAY

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Muscatine, Iowa

RUSH **information and prices on Steinex binders.**

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FOUNDRY _____

CITY _____ STATE _____

CALENDAR of Meetings

Mar. 1—Hoist Manufacturers Association, annual meeting, Sheraton-Cleveland Hotel, Cleveland.

Mar. 7-8—Steel Founders' Society of America, annual meeting, Drake Hotel, Chicago.

Mar. 8—Electric Overhead Crane Institute, Drake Hotel, Chicago.

Mar. 16-17—Foundry Educational Foundation, annual college-industry conference, Hotel Statler-Hilton, Cleveland.

Apr. 13-14—Malleable Founders' Society, Market Development Conference, Edgewater Beach Hotel, Chicago.

Apr. 25-29—American Welding Society, annual meeting and Welding Show, Biltmore Hotel and Great Western Exhibit Center, Los Angeles.

May 9-13—American Foundrymen's Society, 1960 Castings Congress and Exposition, Convention Hall, Philadelphia.

May 9-13—American Society for Metals, Southwestern Metal Exposition & Congress, State Fair Park, Automobile Building, Dallas.

May 11-13—Los Angeles Chapter, American Material Handling Society, Western Regional Materials Handling Show and Packaging Cavalcade, Great Western Exhibit Center, Los Angeles.

May 23-26—Design Engineering Show, Coliseum, New York.

June 2-3—New York University, vacuum metallurgy conference, University Heights (Bronx) Campus, New York.

June 6-7—Malleable Founders' Society, annual meeting, Elbow Beach Surf Club, Hamilton, Bermuda.

June 6-8—Material Handling Institute Inc., New England Show, Commonwealth Armory, Boston.

June 19-21—Alloy Casting Institute, annual meeting, Homestead, Hot Springs, Va.

July 4-8—European Investment Casters Conference, Liege, Belgium.

Sept. 6-16—The Machine Tool Exposition—1960, International Amphitheatre, Chicago.

Sept. 6-16 — Production Engineering Show, Navy Pier, Chicago.

Sept. 19-20—Steel Founders' Society, fall meeting, Homestead, Hot Springs, Va.

Sept. 19-24—International Foundry Congress, Zurich, Switzerland

Sept. 22-23—National Foundry Association, annual meeting, Edgewater Beach Hotel, Chicago.

Oct. 12—Cast Bronze Bearing Institute, annual meeting, Grove Park Inn, Asheville, N. C.

Oct. 12-14—Gray Iron Founders' Society, annual meeting, Netherland Hilton Hotel, Cincinnati.

Oct. 13-15—Non-Ferrous Founders' Society, annual meeting, Grove Park Inn, Asheville, N. C.

Oct. 17-21—American Society for Metals, National Metal Exposition & Congress, Trade and Convention Center, Philadelphia.

Oct. 17-21—National Safety Council, Annual Safety Congress, Chicago.

Oct. 20-22—Foundry Equipment Manufacturers Association, annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

Oct. 21-23—Society for Experimental Stress Analysis, annual meeting, Pick Fort Shelby Hotel, Detroit.

Oct. 22-25—Conveyor Equipment Manufacturers Association, annual meeting, Greenbrier, White Sulphur Springs, W. Va.

Nov. 8-10—Material Handling Institute Inc., Central States Show, Kentucky Fair and Exposition Center, Louisville.

Nov. 14-18—Steel Founders' Society, Technical and Operating Conference, Pick Carter Hotel, Cleveland.

Nov. 30-Dec. 2—Metallurgical Society of AIME, Electric Steel Conference, Morrison Hotel, Chicago.

Circle 564 on Page 53

Why Foundries are Sold on Carver RAPID MULLER

1 "We are using natural bonded sand in our plant and find the Carver Muller has cut down on bonding material better than 50%. We like the Muller very much."

— G. W. Manfull
West Coast Alloys Co.
Troutdale, Oregon

2 "The Carver does a good job for what it was designed. A low priced mixer. Small floor space and does a good job of mixing with CO_2 Sand."

— Nellan Williams, Vice President
Industrial Castings Division
James H. Mathews Co.
Pittsburgh, Pennsylvania

CHECK . . . COMPARE AND YOU'LL CHOOSE CARVER!

- **The fastest! A batch every 75 seconds!***
- **Only one moving part . . . no maintenance worries!**
- **Absolutely no lumps or wet spots!**
- **Easiest to clean! Just reach inside!**
- **3 times lower initial investment than with most mullers!**
- **Works equally well with any kind of binder!**

*Applies to CO_2 Sand. Oil sand may take up to three minutes.

Only Carver Has Everything For the CO_2 Process!

CARVER V & S Core Shooters

CARVER Automatic Gassing Apparatus

KRAUSS Taper Slot Core Vents

STEINEX available only from CARVER

MAIL COUPON TODAY

F-2

CARVER FOUNDRY PRODUCTS CO.
Muscatine, Iowa

I want to compare! Tell me more about Carver Rapid Muller.

NAME _____ TITLE _____

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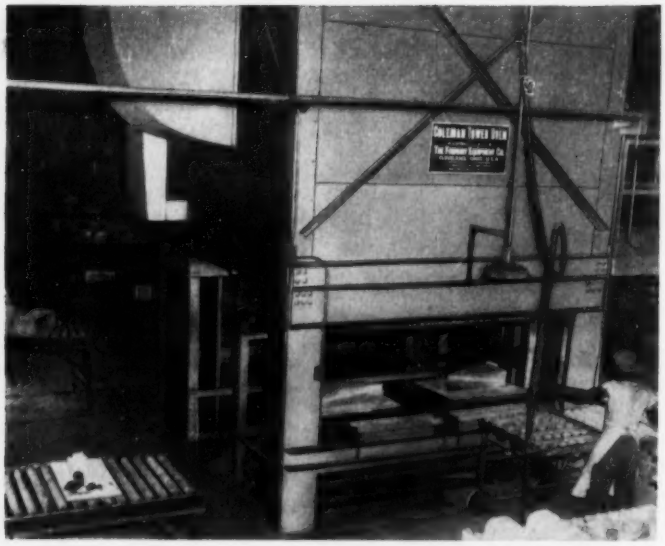
Circle 565 on Page 53

CUT LABOR COSTS with

Coleman Dielectric Core Oven in leading plumbing fixture foundry. Direct labor alone reduced by 75%, with many other important savings and advantages.

Coleman Conveyor Core Ovens



One of two large Coleman Tower® Core Ovens in a major steel foundry baking cores up to 150 pounds. Self-amortizing investment . . . ovens paid for themselves out of direct annual savings in less than two years.

● Performance records in all types of foundries prove that Coleman Conveyor Core Ovens reduce core department costs by as much as 50%.

Coleman Ovens quickly pay for themselves out of direct savings in labor, materials and reduced casting scrap.

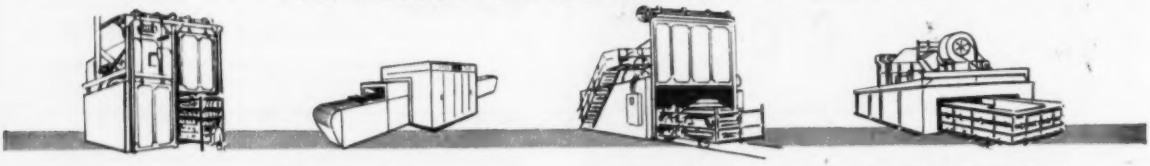
As builders of the world's only complete line of foundry ovens . . . dielectric or recirculating heat . . . we can recommend, without bias, the right oven for your particular needs.

WRITE FOR BULLETIN 54

THE FOUNDRY EQUIPMENT COMPANY • 1821 COLUMBUS ROAD, CLEVELAND 13, OHIO

World's Oldest and Largest Foundry Oven Specialists—More than half a century of specialized foundry experience.

PART OF THE WORLD'S ONLY COMPLETE LINE OF FOUNDRY OVENS



TRANSRACK OVENS | DIELECTRIC CORE OVENS | CAR TYPE OVENS | JET ACTION MOLD OVENS

Circle 566 on Page 53

"No machining complaints since I used SMZ alloy"

You can eliminate chilled corners and hard spots in gray iron castings with ladle additions of "SMZ" alloy. Machining rates can thus be improved by as much as 25 per cent, giving you more satisfied customers.

"SMZ" alloy is the most widely used inoculant in the iron foundry industry. As little as 2 to 4 pounds of "SMZ" alloy per ton of iron are sufficient to eliminate chill in light castings. For harder irons of lower carbon and silicon contents, a larger addition of the alloy may be required.

For information on how "SMZ" alloy can improve the machineability of your castings, contact your UNION CARBIDE METALS representative. Ask for the booklet, "SMZ Alloy – An Inoculant for Cast Iron."

UNION CARBIDE METALS COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

These chill blocks show how "SMZ" alloy reduced chill in a 3.15% carbon, 1.80% silicon iron.

UNION CARBIDE METALS

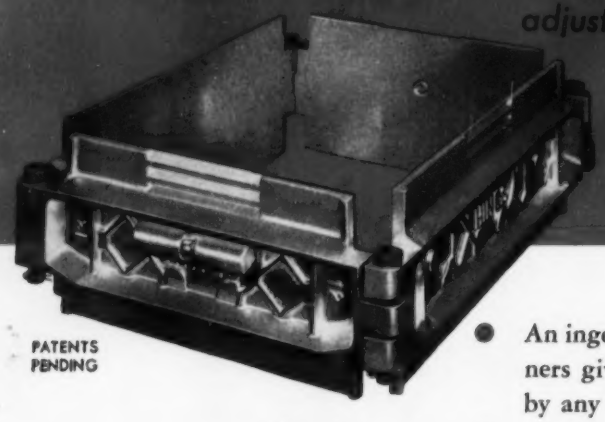
Electromet *Brand Ferroalloys and other Metallurgical Products*

The terms "Electromet," "SMZ," and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

Circle 567 on Page 53

HINES "HI-FLEX" CAST JACKETS

Upon application to the mold, the "HI-FLEX" instantly assumes the exact shape of the mold and automatically adjusts itself to the taper of the mold.



PATENTS PENDING

One of many **HINES** *developments contributing to better foundry production*

- An ingenious pivot-pin arrangement at its four corners gives the "HI-FLEX" a flexibility unmatched by any other jacket on the market.
- Its fit on the mold can easily be changed by replacing corner pins with pins of larger or smaller diameter.
- Replaceable corner pins also permit adjusting the "HI-FLEX" to fit either slip or "POP-OFF" molds.
- Cast of aluminum or iron — jig and fixture built for maximum accuracy.
- End and side castings may be purchased separately. Filleted corner inserts and steel corner protection shields are also available.
- Lengths and widths, 10" to 30". Depths, 6", 8½", 11" and 13½". Special depths available, in half inches.

WRITE FOR CATALOG FOLDER NO. 203

THE HINES FLASK CO.

3431 WEST 140th STREET • CLEVELAND 11, OHIO

HINES FLASKS

Lowest price

doesn't always mean best buy. When you buy chromium alloys "cheap," it may be the most expensive alloy purchase you've ever made.

Fact is, there's only one way to save money when you buy ferroalloys. And that's by choosing the *right* one for the *right* job. But how to do this, when there are hundreds of different applications and dozens of different chromium products? Simple solution. Call your VCA representative.

VCA has a really complete line of quality chromium products, including briquettes. That's why your VCA man can give you an impartial recommendation. No axe to grind, because your satisfaction is his satisfaction. For the alloy that will give you the best possible results at the lowest possible final cost, call your VCA District Office soon! Vanadium Corporation of America, 420 Lexington Avenue, New York 17, New York • Chicago • Cleveland • Detroit • Pittsburgh

Be sure to see us at the AIME Open Hearth Meeting, Palmer House, Chicago, April 4—6.

VANADIUM CORPORATION OF AMERICA

Producers of alloys, metals and chemicals

Mechanize with Jeffrey:

Large mold quickly filled with sand from Jeffrey Flaskfillers, fed from hopper. Jeffrey equipment for mechanizing mold preparation includes Flaskfillers, Hoppers, Automatic Measuring Boxes, Rotary Plate Feeders.

PUSHBUTTON SAND DELIVERY

Cuts Molding Time – Points To Profits

Sand when and where you want it at the touch of a button—that's efficiency in mold preparation. That's what we mean when we say "Mechanize with Jeffrey".

Delivered to overhead hoppers by crane, bucket elevator or belt conveyor, thence to flaskfillers —sand flows directly into the flasks. Saves floor space and shoveling time. Low-cost "package" systems with no custom engineering are available—built to serve two or more stations.

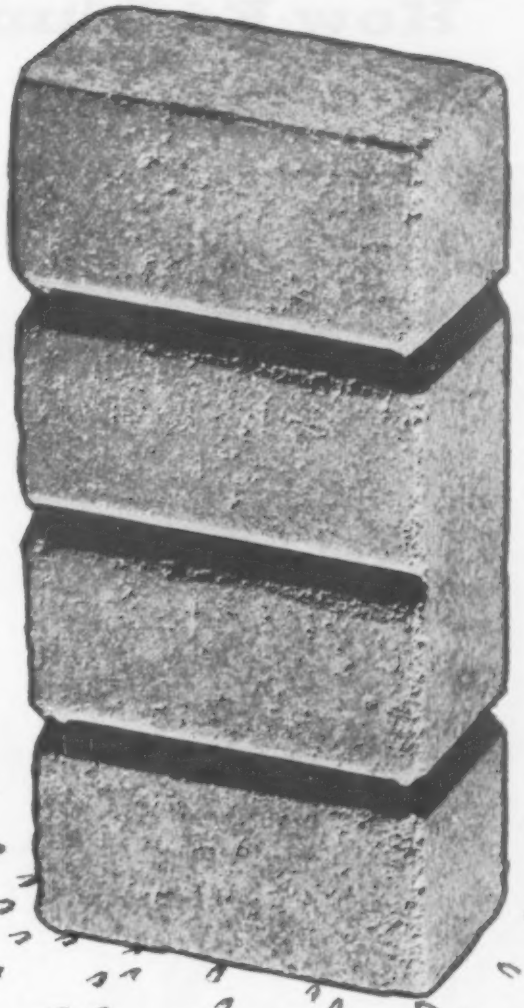
Write for Catalog No. 911, the bible of the foundry industry—modern equipment backed by sound engineering. The Jeffrey Manufacturing Company, 907 N. Fourth St., Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT...TRANSMISSION MACHINERY...CONTRACT MANUFACTURING

make TRACKS to *Famous*

CORNELL CUPOLA FLUX for Cleaner Iron



You produce cleaner castings and cut rejects to a minimum. That's why so many foundries make it "standard operating procedure" to use Famous Cornell Cupola Flux. By constant use of this scientifically-designed mixture of high-grade fluorspar and other materials you get these advantages: increase in the amount of slag that floats and flows off, sulphur greatly reduced, cleaner castings and rejects cut to a minimum.

Why not call us today or send for Bulletin 46-B.

don't accept substitutes...

8 Advantages of Famous CORNELL Aluminum, Copper and Brass Flux Can Help You

- Makes metal pure and clean.
- Permits use of more scrap without danger of dirt, porous places or spongy spots, due to dirty metal.
- Thinner, yet stronger sections can be poured.
- Metal does not cling to the dross as readily.
- Crucible or furnace linings are kept clean and preserved.
- Cleanses molten brass (whether red or yellow) even when the dirtiest brass turnings are used.
- Saves considerable tin and other metals.
- Forms a perfect covering over the metal during melting, prevents oxidation and reduces obnoxious gases to a great extent.

Write for Bulletin 46-A.

The CLEVELAND FLUX Company

1026-40 MAIN AVENUE, N. W. • CLEVELAND 13, OHIO

Manufacturers of Iron, Semi-Steel, Malleable, Brass, Bronze, Aluminum and Ladle Fluxes—Since 1918

FAMOUS CORNELL FLUXES

Trade Mark Registered

GEORGE F. PETTINOS, LTD., Hamilton, Ontario, Canada
Exclusive Representatives in Canada

Circle 571 on Page 53

How Ed Blumberg increased and cut wheel costs, too,

General Malleable of Waukesha, Wisconsin, is one of the finest foundries in the Wisconsin area. A large number of the castings they make are unusually intricate in design. Many of them are used in hydraulic systems calling for the highest possible standards of quality and finish. Dental mirrors are even used to detect imperfections and no shadows are allowed . . . period!

They were perfectly happy with the resinoid cone wheels they had been using . . . until Bay State Abrasive Specialist Ed Blumberg came up with a silicon carbide cone with vitrified bond that did a considerably better job. To be specific, it cost less to buy and lasted 35% longer, too. On top of that, as Cleaning Room Foreman Cliff Raymond says, "these vitrified cones have an exceedingly fast cutting action."

To quote Ed Blumberg himself: "It's surprising how often a simple change of wheel spec. can make a really substantial improvement in performance or in the cost picture . . . or both."

Maybe it's time to check *your* grinding operations. Your Bay State representative, direct or distributor, is an excellent man for the job . . . widely experienced and thoroughly trained. He's backed by Research and Development, Quality Control, and Abrasive Engineering second to none.

Better grinding at lower cost . . . that is our business.

Bay State's Edward W. Blumberg was an Abrasive Specialist for four years before joining Bay State in 1951. Before that, he had wide experience in the machine tool business so his knowledge of abrasive and metals is unusually broad as well as highly detailed.

grinding wheel life 35% at General Malleable Corp.

Operator Raymond Hatch removes core fin from tractor clutch housing, using Bay State's fast-cutting silicon carbide cone wheel with vitrified bond.

Plant Superintendent Paul Dumbleton examines finished casting with Cleaning Room Foreman Cliff Raymond.

BAY STATE ABRASIVES

BAY STATE WHEELS of PROGRESS

Bay State Abrasive Products Co., Westboro, Massachusetts.
In Canada: Bay State Abrasive Products Co., (Canada) Ltd., Brantford, Ontario.
Branch Offices: Chicago, Cleveland, Detroit, Los Angeles, Pittsburgh. *Distributors:* All principal cities.

Circle 572 on Page 53

An engineering case history from Lester B. Knight & Associates, Inc.

MAJOR PRODUCTION INCREASE THROUGH MAXIMUM USE OF SPACE AND EQUIPMENT

Knight Engineers, working with the client,* modernized existing facilities to obtain maximum use of facilities and equipment with minimum manning. Capital expenditure was kept at a minimum. The changeover was done during the annual, two-week vacation shut-down... normal production was not interrupted. Production increased 50% with fewer people in the crew. The cost of the changes was equivalent to the labor cost reduction in one year.

Another example of how Lester B. Knight engineering know-how in all phases of foundry operation can help attain desired production goals by finding ways to get the most out of present equipment. A letter will bring a call from a Knight representative, at your convenience.

*Name on request

KNIGHT SERVICES INCLUDE:

Foundry Engineering • Architectural Engineering • Construction Management • Modernization • Mechanization • Automation • Survey of Facilities • Materials Handling • Methods. Industrial Engineering • Wage Incentives • Cost Control • Standard Costs • Flexible Budgeting Production Control • Organization • Marketing

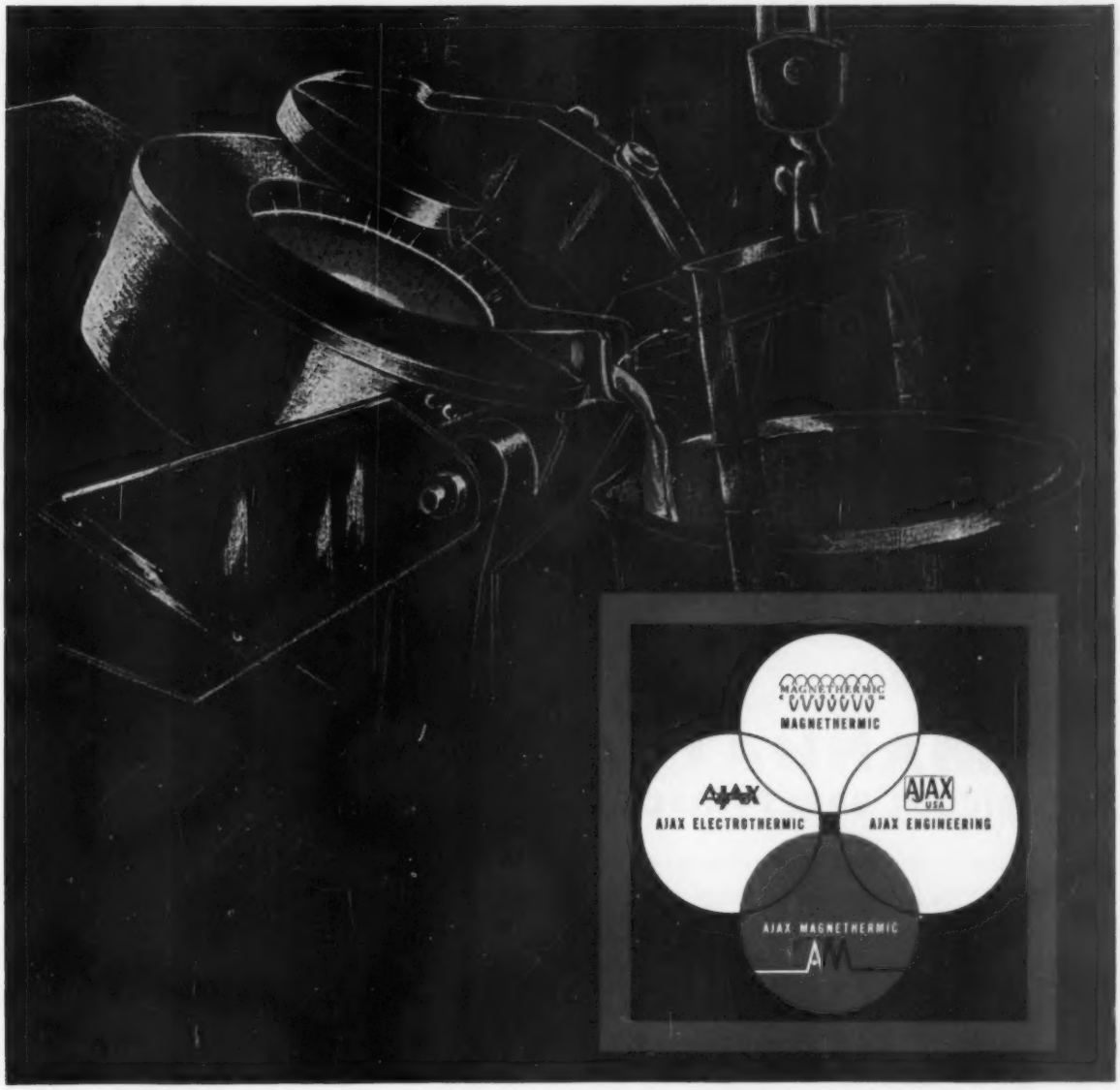
Lester B. Knight & Associates, Inc.

Management, Industrial and Plant Engineers

Member of the Association of Consulting Management Engineers, Inc.

549 W. Randolph St., Chicago 6, Ill.

New York Office—Lester B. Knight & Associates, Inc., Management Consultants, 500 Fifth Ave., New York 36
Knight Engineering Establishment (Vaduz), Zurich Branch, Dreikönigstrasse 21, Zurich, Switzerland
Lester B. Knight & Associates, G.M.B.H., Berliner Allee 47, Düsseldorf, Germany



Ajax Magnethermic supplies all types of Induction Melting Furnaces including: core, coreless, lift and automatic pouring. Vacuum melting and degassing applications are among their many uses. 60 cycle, motor generator, mercury arc converters, R. F. generators and the new 180 cycle Multiductor, all products of AM, are available as the power source.

THE NEW NAME WITH THE FAMILIAR RING!

Induction Melting Furnaces from 8 ozs. to 8 tons capacity,
one of many product lines of AM,
pioneer builder of induction heating equipment since 1920.

"induction heating is our only business"

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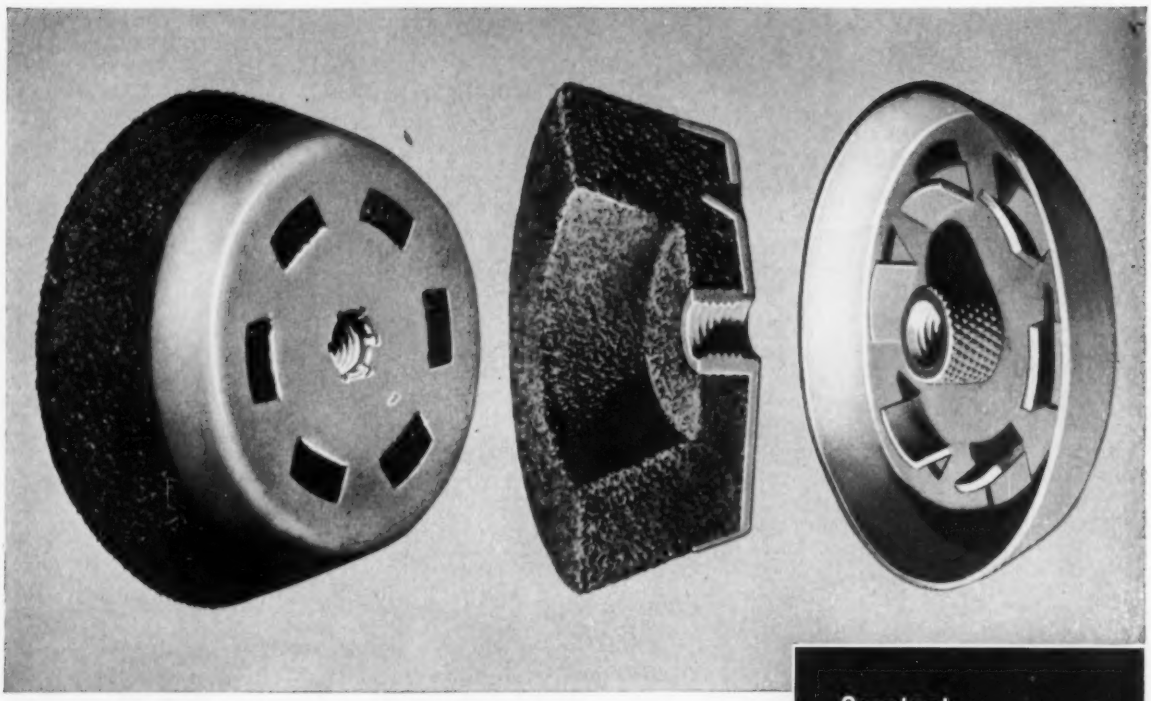

MANHATTAN

THE ORIGINAL *SAFETY BACK* FLARED CUP

The first wheel to offer the exclusive features of the Safety Back Flared Cup! This totally new concept of design *and* construction puts portable wheel *safety* where it counts the most — in *original* strength and breakage resistance! With Safety Back, steel covers the entire back of the flared cup . . . extends down the side to assure a degree of reinforcement never before available with anchor bushings, safety rings, special hub mountings or ordinary revolving cup guards.

You can't get a safer wheel to use . . . and you can't find a better performing wheel to use on your portable grinders. Every Manhattan Safety Back Flared Cup is custom-bonded with the right abrasive for *faster* removal of *more* metal on your particular job — at no extra cost!

For faster cutting, longer lasting, *safer* abrasive wheel performance — "More Use per Dollar" — be certain you get the original Manhattan Safety Back Flared Cup. Let your Manhattan abrasive wheel engineer show you the exclusive advantages of this and other Manhattan high speed, heavy duty abrasive wheels. Write for Bulletin 7157.

- Greatest Initial Strength
- Easy Mounting — Easy Operation
- Highest Safety Factor
- Requires No Adjustment
- One Piece Assembly
- Improved Mounting Base

"MORE USE PER DOLLAR"

ENGINEERED RUBBER PRODUCTS . . . MORE USE PER DOLLAR

RM

RM 1060

WRITE TO ABRASIVE WHEEL DEPARTMENT

MANHATTAN RUBBER DIVISION • PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Circle 575 on Page 53

YOURS FOR THE ASKING!

SOMETHING NEW, something simple, something down-to-earth has been added to the literature dealing with the problems of blast cleaning! It is a carefully written and carefully documented brochure on "*The* FACTS *of life, concerning the use of* SHOT AND GRIT." This brochure is YOURS FOR THE ASKING. If you like a restrained, friendly and completely honest appraisal of the blast cleaning problem, this booklet is for you.

The brochure is divided into five sections: 1, blast cleaning functions and materials . . . a frank appraisal of the problems as a whole; 2, progress and research achievements in the manufacture of shot and grit, with a quick look into the future; 3, housekeeping practices, an area completely under your control; 4, proofs, if you're from Missouri, how facts and figures support our statements; and 5, a suggestion on how to take action, without committing yourself.

Sure, we have an axe to grind . . . we'd like to sell you our shot and grit. Or, to put it another way, we'd like to have you BUY our shot and grit, because you are convinced they will do the best job. But whether you buy our products or whether you don't, the wealth of practical information in this brochure will prove to be useful and interesting and we'd like for you to have a copy. Fair enough?

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FOR THE ASKING!

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Sole manufacturers of
Permabrasive® and Controlled "T"® abrasives.

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OK! Send me a copy . . . FREE!

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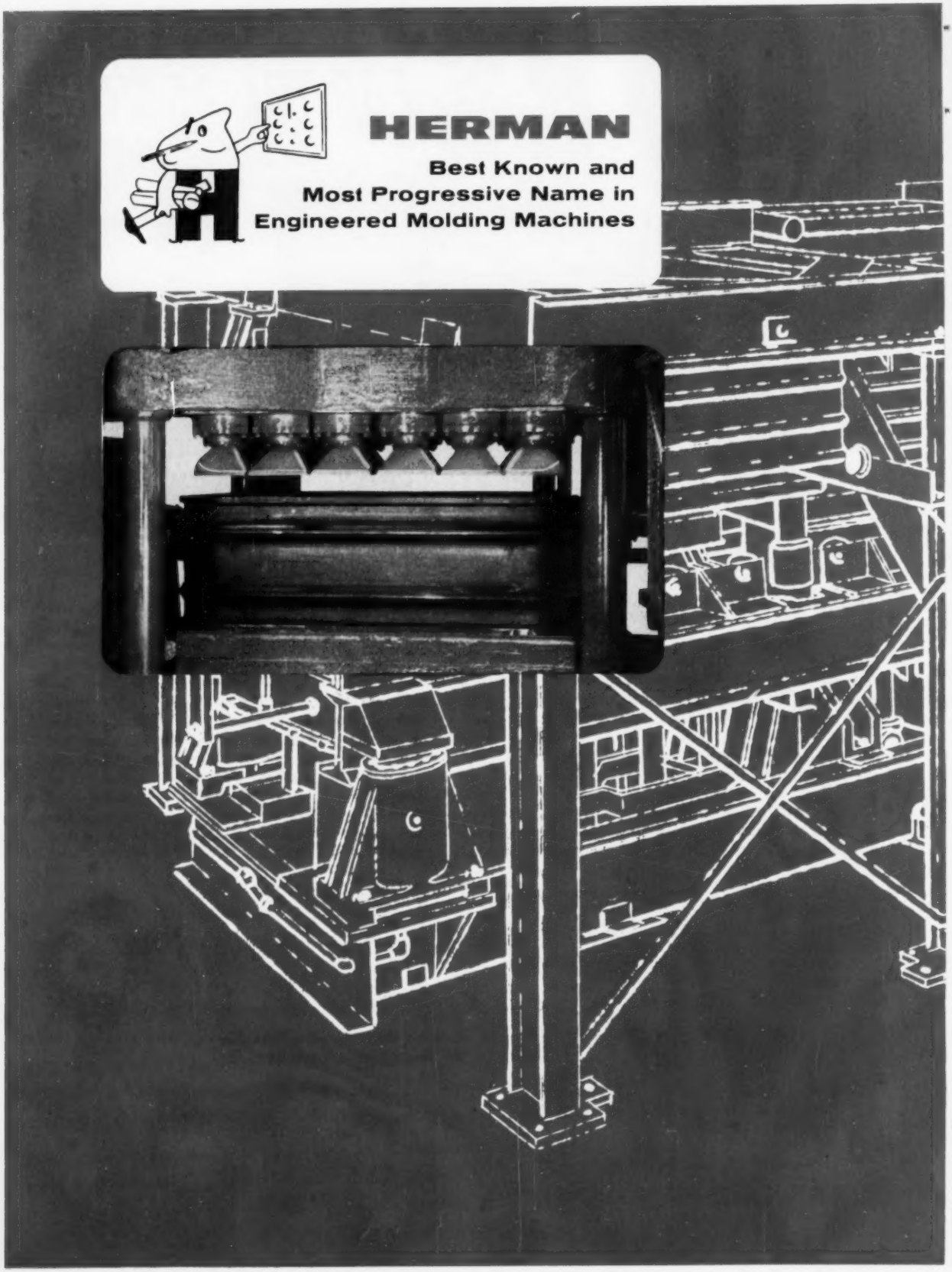
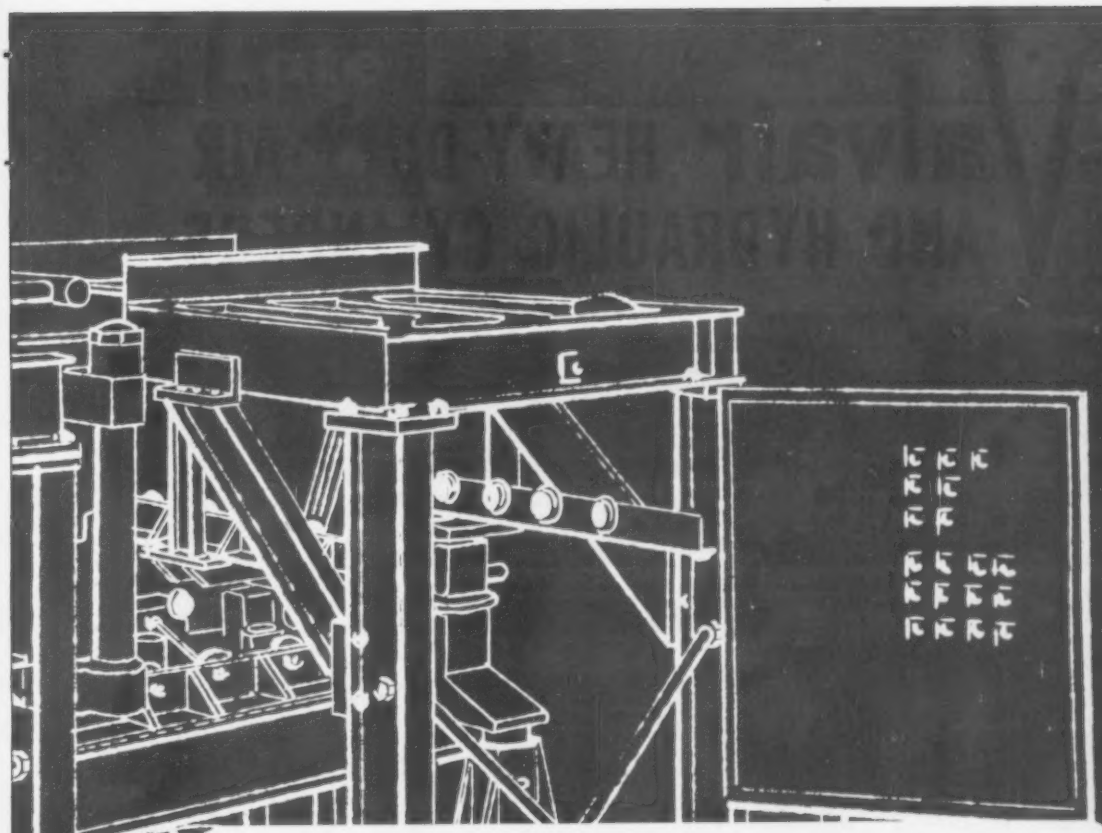
Circle 576 on Page 53


HERMAN
Best Known and
Most Progressive Name in
Engineered Molding Machines



the Moldmaster, for instance...

This is another progressive development synonymous with our theme in the headline of this ad.

The Moldmaster is a truly revolutionary machine which meets the normal molding requirements of most foundries.

This is a sweeping statement, but look, for a moment, at just 5 of its engineered features:

1. It's a squeeze, strip or squeeze rollover machine designed to operate by automatic, semi-automatic or manual push button controls.
2. It's versatile—the self-adjusting squeeze head flows the sand in such a manner as to insure a perfect mold.
3. Minimum wear.
4. The jolt feature can be furnished if required.
5. Maximum jolting efficiency is assured by the adjustable jolt control valve.

There are 15 other outstanding characteristics of this Herman molding machine you should know about.

Why don't you call in a nearby Herman Sales Engineer *right* now for a discussion?

You can be confident that somewhere in the *complete* Herman range of equipment there is a type to fit your requirements.

Moldmaster brochure on request, naturally.

HERMAN PNEUMATIC MACHINE CO.
UNION BANK BUILDING, PITTSBURGH 22, PA.

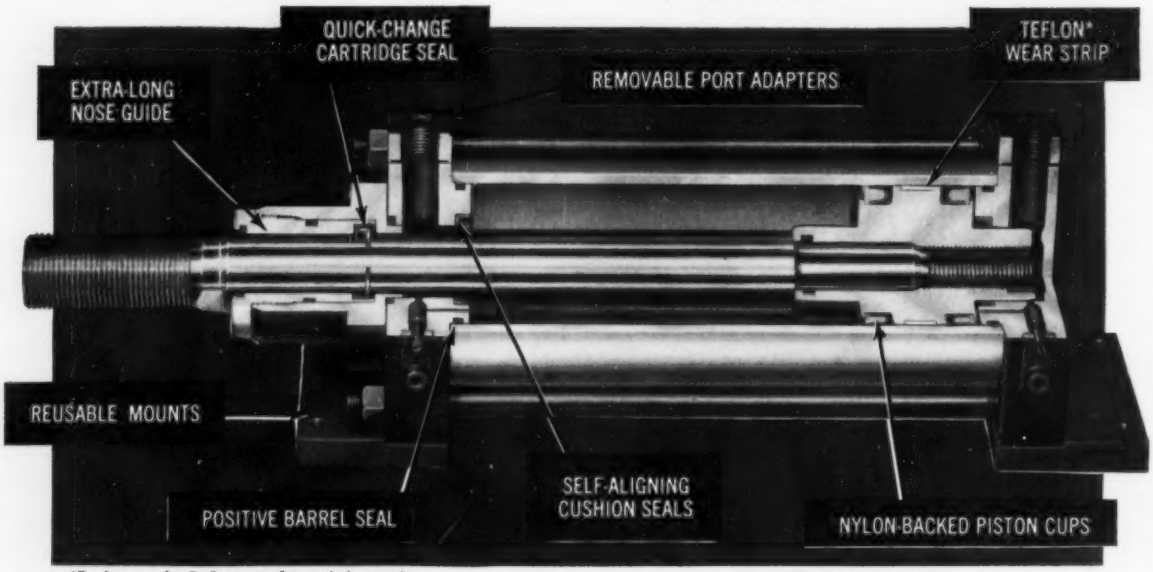
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

Circle 577 on Page 53

new...
new...
new...

Valvair® HEAVY-DUTY AIR AND HYDRAULIC CYLINDERS

200 psi air, 500 psi hydraulic



*Trade name for Du Pont tetrafluoroethylene resin

. . . will provide efficient, dependable service on your high-production equipment

A look inside shows you why Valvair heavy-duty cylinders belong on *your* high-production machines! Built by Valvair, makers of famous SPEED KING valves, these heavy-duty cylinders provide design, construction and component material features coordinated to assure efficient operation, longest service life and minimum downtime.

Whether you're ordering new machines, or modernizing equipment now in use, it'll pay you to specify Valvair heavy-duty cylinders for all your high-production machines. A full range of bore and rod sizes, interchangeable *and reusable* mountings, stroke lengths and cushioning options are available.

Call in your nearby Valvair or Bellows field engineer today . . . take advantage of one-source responsibility for all your control system needs . . . cylinders, valves, manifolds, filters, regulators and lubricators.

For detailed information, write for Bulletin VC-800. Address Dept. FO 360, Valvair Corporation, Akron 11, Ohio

Offices in principal cities

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Other INDUSTRIAL DIVISIONS of IBEC: The Sinclair-Collins Valve Co. The Bellows Co., Akron, Ohio • V. D. Anderson Co., Cleveland, Ohio.

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VALVAIR AIR & HYDRAULIC CYLINDERS • SPEED KING CONTROL VALVES AND MANIFOLDS • PLUG-IN CONTROL VALVES AND MANIFOLDS
HI-SPEED INLINE VALVES • PILOT VALVES • MINI-KING VALVES • MANUAL VALVES • FILTERS • REGULATORS • LUBRICATORS

Late News

EQUIPMENT BUYING RISES: Sales index of new foundry equipment dropped to 95.9, the low point for the year, in December, but the 1959 average was 143, or 60 per cent more than in 1958, the Foundry Equipment Manufacturers Association reports. During the last ten years, only 1955 and 1956, with 150 and 149 averages, exceeded 1959—and then by only 5 per cent. Average for the ten-year period 1950-59 was 125. On this scale, the 1947-49 average equals 100.

CASTING OUTLOOK: Increasing concern about the developing economic picture has prompted a rash of reassurances from business forecasters of late. Most feel sure that 1960 still will be a very good year, although likely not the runaway boom many predicted earlier. Chief causes for alarm have been lagging car sales, an unexpectedly low level of steel orders, and a shaky stock market.

Car manufacturers still are talking about producing up to 7 million cars, however, and freight car orders began to zoom at the close of 1959. In addition, suppliers of castings to the steel industry should be getting orders soon. The stretching out of steel orders is interpreted more as a decision not to overbuild inventories than as a slowdown in business. All in all, the situation seems to call more for caution than for alarm.

FREIGHT CARS ROLL: As mentioned above, the railroads have entered the market for freight cars again, and in high gear. Of the 56,494 cars ordered in 1959, 10,560 went on the books in December. January, 1960, orders came to 7149, compared with 4007 in Janu-

Foundry Statistics

Iron and Steel Scrap Consumption

(Gross tons*)

	All Scrap Total	By Types of Furnace — Cupola Total	Air Total	Electric Total
1957	65,688,592	9,220,405	1,026,951	8,876,400
1958				
June	4,409,006	615,271	62,703	605,733
6 mo.	22,982,262	3,751,164	390,428	3,347,626
July	3,716,739	543,726	47,203	513,394
Aug.	4,203,034	580,844	66,877	592,727
Sept.	4,472,219	650,660	71,198	637,400
Oct.	5,091,207	707,378	90,707	757,722
Nov.	4,803,615	700,704	74,382	691,078
Dec.	4,973,670	761,494	80,593	712,779
Total	50,242,746	7,725,970	821,388	7,152,726
1959				
Jan.	5,375,042	783,045	86,519	767,289
Feb.	5,657,873	791,137	88,326	801,692
Mar.	6,677,499	873,982	101,986	965,048
Apr.	6,644,905	911,313	106,972	996,126
May	6,642,572	868,661	99,256	1,029,573
June	6,322,404	885,497	104,683	997,921
6 mo.	37,338,295	5,113,635	607,742	5,557,649

Index of Foundry Equipment Orders

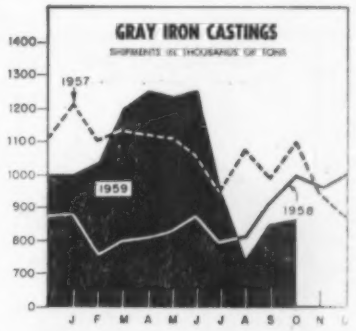
Foundry Trades Only

(Net Orders Closed, New Equipment)

	1958	1959
Jan.	57.9	127.4
Feb.	57.6	237.1
Mar.	85.9	166.6
Apr.	88.7	154.2
May	136.1	157.0
June	87.7	125.1
July	77.9	110.7
Aug.	74.1	134.1
Sept.	64.5	131.3
Oct.	118.9	140.8
Nov.	83.3	131.2
Dec.	137.0	95.9

Note: Base period 1947-49 taken as 100 per cent monthly average.

Source: Foundry Equipment Manufacturers Association.



GRAY IRON CASTINGS—SHIPMENTS

(Net tons)[1]

	All Castings — Total	All Castings — For Sale	Miscellaneous Castings Total	Miscellaneous Castings For Sale	Nodular Iron Castings Total	Heavy Steel Ingot Molds Total	Chilled Railroad Car Wheels Total	Pressure Pipe & Fittings Total[2]	Soil Pipe & Fittings Total[2]	Unfilled Orders[3]
1957	12,664,504	6,876,497	7,786,229	3,310,915	.....	2,409,290	359,332	1,351,345	758,308	.....
1958										
Nov.	958,308	505,290	575,586	231,669	11,731	201,704	18,801	98,328	63,889	602,375
11 mo.	9,373,624	5,344,655	6,526,658	2,410,908	104,516	1,675,454	247,093	1,192,506	731,912	.....
Dec.	997,608	509,499	628,720	246,289	13,072	208,942	18,921	85,179	56,746	605,096
Total	10,371,232	5,863,154	6,155,378	2,657,197	117,588	1,884,396	265,114	1,277,685	788,650	.....
1959										
Jan.	1,001,771	517,390	625,604	250,161	12,061	214,955	27,650	75,571	58,056	687,245
Feb.	1,036,655	538,514	642,852	252,115	12,619	230,706	31,035	76,147	56,885	767,360
Mar.	1,205,572	666,034	701,527	286,692	13,881	270,293	35,820	108,131	89,801	846,937
Apr.	1,245,702	688,755	726,105	295,982	14,663	270,476	35,655	129,861	83,605	892,214
May	1,236,250	685,285	706,073	285,507	16,003	275,563	36,969	141,675	75,979	884,779
June	1,252,016	717,067	707,291	295,064	15,510	268,479	30,723	160,540	84,983	836,707
July	943,486	532,976	602,261	252,907	14,508	107,604	20,486	133,175	79,960	897,536
Aug.	743,564	506,756	485,444	254,232	11,046	13,482	18,479	145,853	80,306	872,993
Sept.	850,043	528,145	595,435	279,357	11,875	19,416	16,272	142,660	76,260	883,278
Oct.	871,779	520,322	622,599	277,927	17,797	20,155	19,647	139,716	69,662	886,970
Nov.	831,504	516,032	493,508	250,342	12,698	165,139	16,723	96,086	60,048	885,368
11 mo.	11,218,352	6,417,276	6,908,729	2,980,286	152,661	1,856,298	289,450	1,349,414	814,545	.....

*Source: U. S. Dept. of Interior Bureau of Mines. [1]Source: Bureau of Census. [2]For sale only. [3]All cast iron pipe is shipped for sale.

Late News

ary, 1959. As of Feb. 1, the freight car backlog totaled 48,170 against 29,470 a year ago.

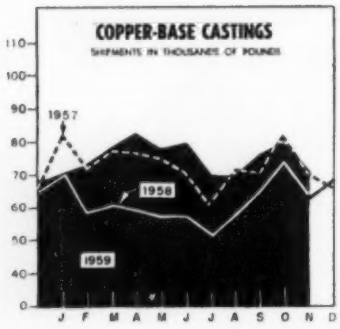
THIS IS A FOUNDRY?: It's not suggested practice, but some Milwaukee foundrymen recently demonstrated they could pour sound castings on a downtown sidewalk of a large city during a snowstorm. The stunt helped to mark the 25th anniversary of the Wisconsin Chapter, AFS, and to promote its regional conference starting the next day. Molten aluminum was brought in an insulated ladle from Lawran Foundry Co. to the Schroeder Hotel entrance, where molds were set up and two commemorative plaques were poured.

NOT CLOSING: Rumors that Ford Motor Co.'s hardware plant at Sandusky, Ohio, is closing are false. Consideration is being given to stopping zinc diecasting operation in midsummer because fewer zinc parts are contemplated for 1961 models of Ford cars. Many of those parts will be converted to aluminum stampings and possibly to aluminum diecastings. The Sandusky Hardware Plant has facilities for that production. Management is studying ways to bring more jobs into the plant to absorb manpower from the zinc diecasting operation.

GIFS CLINICS: Gray Iron Founders' Society, Cleveland, has scheduled seven one-day cost-cutting clinics for designers, engineers, and buyers. They will be held at Berkeley, Calif., Mar. 28; Chicago, April 4; Milwaukee, April 7; Newark, N. J., April 12; Toronto, April 14; Cleveland, April 18, and Cincinnati, April 21. Sessions will be conducted by Charles Walton, technical director, and Richard C. Meloy, marketing director. Classes are limited to 40, and the $25 fee includes a copy of the *Gray Iron Castings Handbook*.

OBITUARY: Herbert L. Mausk, 69, former vice president, National Malleable & Steel Castings Co., Cleveland, died Feb. 13 in Tryon, N. C. . . . Frank D. O'Neil, 58, sales representative, Allied Steel Castings Co., Harvey, Ill., died Feb. 6 in Mobile, Ala., while on a vacation trip. He had been vice president and treasurer of the former Western Foundry Co., Chicago . . . Edwin A. Watson, 76, former

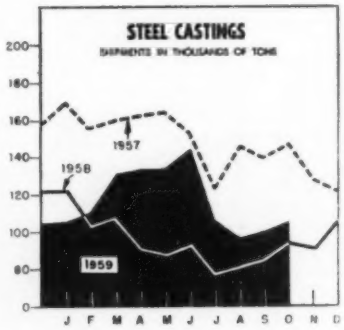
Foundry Statistics



COPPER-BASE CASTINGS

(Shipments of castings—1000 pounds[1])

	Shipments			Unfilled Orders[2]
	Total	Sand	Perm. Mold	
1957	874,627	789,014	44,789	.....
1958				
Nov.	64,746	59,690	2,274	24,928
11 mo.	692,606	633,860	28,749	.....
Dec.	69,878	63,500	3,105	25,078
Total	762,484	697,360	31,854	.....
1959				
Jan.	70,123	62,266	3,753	25,344
Feb.	72,754	64,558	4,007	26,468
Mar.	73,641	69,472	4,333	29,373
Apr.	82,799	73,567	4,640	29,941
May	78,413	69,351	4,363	27,074
June	79,366	70,512	4,421	30,389
July	69,073	61,650	3,869	31,820
Aug.	68,979	60,346	4,410	32,117
Sept.	75,739	66,211	4,809	29,396
Oct.	79,832	69,583	5,172	28,092
Nov.	70,674	61,490	4,893	29,147
11 mo.	826,393	729,006	48,670	.....



STEEL CASTINGS—SHIPMENTS

(Net tons[1])

	All Castings			Carbon			Alloy			Unfilled Orders[2]
	Total	For Sale	Railway Specialties	Total	For Sale	Railway Specialties	Total	For Sale	Railway Specialties	
1957	1,766,191	1,359,747	349,059	1,328,478	1,019,090	324,951	437,713	340,657	24,108	.....
1958										
Nov.	85,267	65,788	9,648	59,793	45,808	8,501	25,474	19,980	1,147	193,960
11 mo.	1,017,200	775,848	136,457	725,831	547,069	124,317	291,369	228,257	12,140	.....
Dec.	103,800	81,360	13,187	76,015	59,171	11,934	27,785	22,189	1,253	214,352
Total	1,121,000	856,986	149,644	801,846	606,240	136,251	319,154	250,746	13,393	.....
1959										
Jan.	105,392	82,683	14,408	76,242	59,927	12,948	29,150	23,656	1,460	232,646
Feb.	110,280	86,013	14,686	79,365	61,261	13,316	30,645	24,752	1,370	245,096
Mar.	131,317	103,848	20,086	93,309	75,968	18,410	35,008	27,880	1,676	270,682
Apr.	134,344	104,890	21,372	99,295	76,802	19,761	35,049	28,088	1,611	271,613
May	135,359	105,804	23,825	101,504	78,767	22,498	33,855	27,037	1,327	263,969
June	143,624	111,725	26,567	107,000	82,485	24,568	36,624	29,240	1,999	248,782
July	106,790	83,541	16,007	78,316	60,502	14,520	28,474	23,039	1,487	274,065
Aug.	98,014	79,188	17,607	74,825	60,243	16,373	23,189	18,945	1,234	279,261
Sept.	99,731	79,963	13,975	73,648	58,453	12,830	26,083	21,510	1,145	256,871
Oct.	105,570	84,850	11,819	80,127	63,901	10,978	25,443	20,108	841	268,874
Nov.	109,460	86,026	11,764	77,320	59,294	10,799	29,305	26,732	965	301,858
11 mo.	1,279,881	1,008,531	192,116	940,951	736,703	177,001	332,825	270,987	15,115	.....

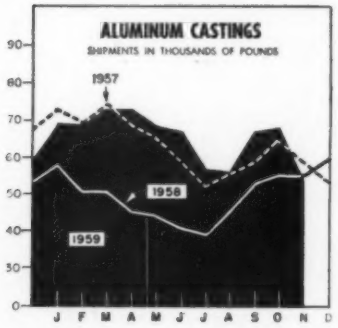
[1]Source: Bureau of the Census. [2]For sale only.

editor of the *Iron Worker*, a publication of Lynchburg Foundry Co., Lynchburg, Va., died Feb. 3.

NICKEL AMPLE: Free world capacity for nickel production last year was at an annual rate of about 275,000 tons, according to Dr. John F. Thompson, chairman, International Nickel Co. of Canada Ltd. This capacity compares with 1959 consumption of slightly more than 200,000 tons. Consumption last year was 25 per cent larger than in 1958. Production capacity is expected to increase by 50,000 tons the next two years.

PERSONALS: Stowell C. Wasson, staff vice president, National Malleable & Steel Castings Co., Cleveland, has retired. He will stay on as a director . . . Charles Wieber has been promoted to works manager, Sivyer Steel Casting Co., and will be responsible for operations at both the Milwaukee and Chicago plants . . . Elton E. Staples has been appointed president, Hevi-Duty Electric Co., a division of Basic Products Corp. He succeeds Harold E. Koch, executive vice president of Basic Products and president of Como-Cast Corp., a Basic subsidiary . . . Emil J. Romans, formerly foundry superintendent, National Malleable & Steel Castings Co., Cleveland, has joined Canton Malleable Iron Co., Canton, Ohio, as general superintendent . . . Dr. Frederick J. Dunkerley, formerly assistant general manager, Rolle Aluminum Co., Philadelphia, has become vice president in charge of production for all plants, Wellman Bronze & Aluminum Co., Cleveland . . . Martin F. Scheider has joined White Diesel Engine Div., White Motor Co., as foundry manager . . . Ralph E. Anderson has joined Brillion Iron Works Inc., Brillion, Wis., as chief metallurgist.

MISCELLANY: Gorham Mfg. Co., Providence, R. I., has acquired Rabun Bronze Foundry, Huntington Park, Calif., and will operate it as a wholly owned subsidiary . . . Total primary aluminum production in the United States in 1959 was 1,953,039 tons, compared with 1,565,556 tons in 1958 . . . Castings Inc. has begun operation at 50 W. Columbus St., Mount Sterling, Ohio, producing aluminum and brass castings . . . Sales of industrial material handling equipment during 1959 rose 20 per cent over 1958 bookings.



PRODUCTION WORKERS

Estimated Number

	Nov. 1959	Oct. 1959	Nov. 1958
Ferrous	219,000	226,900	203,500
Nonferrous	66,300	67,600	61,500

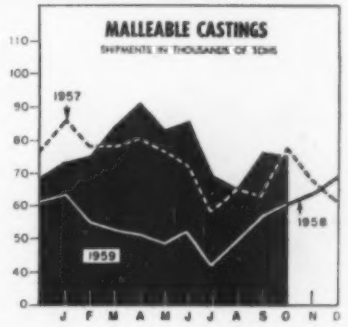
Average Weekly Earnings

Gray Iron	$93.45	$95.92	$90.48
Malleable Iron	94.41	93.84	91.03
Steel	96.01	97.15	95.73
Nonferrous	100.86	103.58	96.63

Average Weekly Hours

Gray Iron	39.1	39.8	38.5
Malleable Iron	39.5	39.1	38.9
Steel	37.8	38.4	38.6
Nonferrous	41.0	41.6	40.6

Source: Bureau of Labor Statistics.



ALUMINUM CASTINGS

(Shipments of castings—1000 pounds[1])

	Shipments Total	Sand	Perm. Mold	Die	Unfilled Orders[2]
1957	751,818	143,991	232,326	373,586	.....
1958					
Nov.	59,836	11,318	20,508	27,904	76,370
11 mo.	577,522	113,761	201,144	260,912	.....
Dec.	64,178	11,726	22,948	29,363	78,732
Total	641,700	125,487	224,092	290,275	.....
1959					
Jan.	68,896	11,238	24,844	32,813	83,314
Feb.	68,381	10,802	25,428	32,147	82,001
Mar.	73,351	12,412	26,954	33,949	82,676
Apr.	72,976	12,700	26,153	33,992	85,636
May	68,268	11,979	25,283	30,877	90,325
June	66,479	12,312	24,927	29,092	81,225
July	56,911	11,581	20,410	24,786	80,450
Aug.	55,904	11,130	17,824	26,818	82,488
Sept.	66,193	12,309	21,506	32,239	81,839
Oct.	67,499	12,958	21,781	32,640	78,930
Nov.	54,549	10,813	16,328	27,295	84,413
11 mo.	719,397	130,234	251,446	336,648	.....

[1]Source: Bureau of the Census. [2]For sale only.

MALLEABLE IRON CASTINGS

(Shipments of castings—net tons[1])

	Shipments Total	For Sale	Standard Total	For Sale	Pearlitic Total	For Sale	Unfilled Orders[2]
1957	862,976	520,118	713,539	431,662	149,437	88,456	.....
1958							
Nov.	63,356	35,221	50,063	28,409	13,293	6,812	66,725
11 mo.	592,275	344,798	486,793	280,714	105,482	63,084	.....
Dec.	68,385	41,041	53,797	32,883	14,588	7,158	65,904
Total	660,650	383,839	540,600	313,597	120,050	70,242	.....
1959							
Jan.	73,186	43,667	56,700	35,139	16,486	8,528	77,322
Feb.	74,760	42,093	57,573	31,976	17,187	10,117	90,291
Mar.	84,335	49,690	67,439	40,515	16,896	9,175	95,822
Apr.	90,974	54,306	75,583	43,835	15,391	10,471	102,508
May	83,472	49,619	66,512	40,438	16,960	9,181	99,879
June	85,497	51,411	68,426	42,453	17,071	8,958	98,339
July	69,184	43,128	55,120	35,787	14,064	7,341	75,252
Aug.	65,062	40,448	53,217	33,224	11,845	6,919	85,852
Sept.	76,063	46,469	60,209	36,619	15,854	9,850	82,274
Oct.	75,511	46,625	61,683	40,088	13,828	8,537	85,031
Nov.	58,258	42,235	48,951	33,981	9,307	8,254	82,555
11 mo.	809,416	511,356	671,413	414,055	167,880	97,331	.....

Prices of Foundry Metals and Coke

(As of Feb. 22, 1960)

FOUNDRY COKE

(Per net ton, f.o.b. ovens)

BEEHIVE

Connellsville	$18.00-18.50

OVEN

Birmingham	$30.35
Buffalo	32.00
Detroit	32.00
Erie, Pa.	32.00
Indianapolis	31.25
Kearny, N. J.	31.25
Milwaukee	32.00
Neville Island (Pittsburgh)	30.75
New England, deld.	33.55
New Haven, Conn.	31.00
Painesville, O.	32.00
Philadelphia	31.00
St. Louis	33.00
St. Paul	31.25
Swedeland, Pa.	31.00
Terre Haute, Ind.	31.25

PIG IRON

(Per gross ton, f.o.b. furnace)

	No. 2 Foundry	Malleable
Birdsboro, Pa.	$68.50	$69.00
Birmingham	62.50	66.50
Buffalo	66.50	67.00
Chester, Pa.	Nom.	Nom.
Chicago	66.50	66.50
Cleveland	66.50	66.50
Duluth	66.50	66.50
Erie, Pa.	66.50	66.50
Everett, Mass.	68.00	68.50
Fontana, Calif.	75.50	.....
Geneva, Utah	66.50	.....
Granite City, Ill.	68.40	68.90
Neville Island (Pittsburgh)	66.50	66.50
Swedeland, Pa.	68.50	69.00
Toledo, O.	66.50	66.50
Troy, N. Y.	68.50	69.00
Youngstown, O.	.....	66.50

NONFERROUS INGOT

(Cents per pound, carlots)

BRASS AND BRONZE: Red brass, No. 115, 30.75; tin bronze, No. 225, 41.50; No. 245, 36.00; high-leaded tin bronze, No. 305, 35.25; No. 1 yellow, No. 405, 24.75; manganese bronze, No. 421, 29.25.

ALUMINUM: 99 per cent plus primary ingots 28.10. Secondary No. 12 alloy, 25.00-25.25. Deoxidizing grades: No. 1, 25.75; No. 4, 22.75.

MAGNESIUM: 99.8 per cent notched ingots 36.00, f.o.b. Velasco, Tex. (10,000 lb or more).

COPPER: Electrolytic 33.00, delivered Connecticut valley.

ZINC: High grade 14.25, delivered. Die casting alloy No. 3, 16.50; No. 2, 17.00, delivered.

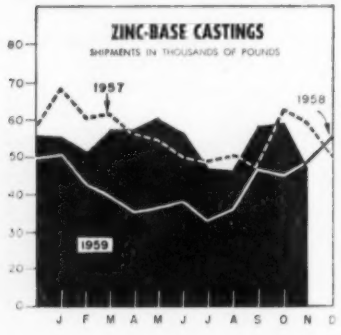
Iron and Steel Scrap

(Consumer prices per gross ton delivered, except as otherwised noted)

	No. 1 Heavy Melting Steel	No. 1 Cupola Cast	Heavy Breakable Cast	Clean Auto Cast	Machinery Cast	Malleable	Short Steel Rails
Birmingham	$37.00-38.00	$53.00-54.00	.....	.....	.....	.....	$56.00-57.00
Boston*	**35.00-36.00	**39.00-40.00	.....	.....	**40.00-42.00	.....	.....
Buffalo	36.00-37.00	**47.00-48.00	.....	.....	**49.00-50.00	.....	53.00-54.00
Chicago	40.00-41.00	50.00-51.00	.....	57.00-58.00	57.00-58.00	59.00-60.00	56.00-58.00
Cincinnati*	**36.00-37.00	**47.00-48.00	**39.00-40.00	.....	**55.00-56.00	.....	**60.00-61.00
Cleveland	40.00-41.00	53.00-54.00	39.00-40.00	56.00-57.00	54.00-55.00	62.00-63.00	61.00-63.00
Detroit*	**34.00-35.00	**43.00-44.00	**37.00-38.00	**50.00-51.00	.....	.....	.....
Los Angeles*	38.00	46.00-47.00	.....	.....	.....	.....	.....
New York*	36.00-37.00	37.00-38.00	37.00-38.00	.....	.....	.....	.....
Philadelphia	40.00	42.00	47.00	.....	53.00	66.00	.....
Pittsburgh	40.00-41.00	50.00-51.00	.....	47.00-48.00	55.00-56.00	.....	62.00-64.00
St. Louis*	36.00	52.00	43.00	55.00	.....	.....	52.00
San Francisco	38.00	46.00	28.00	40.00	49.00	.....	.....
Seattle	36.00	35.00	30.00	.....	.....	.....	.....

*Brokers' buying prices. **F.o.b. shipping point

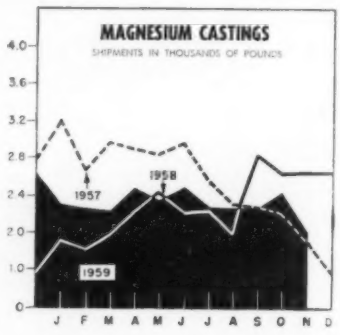
Foundry Statistics



PIG IRON

PRODUCTION—Net Tons

	Foundry	Malleable & Silvery	Low & Int. Phos. & Bessemer
1957	2,275,789	3,697,335	7,452,203
1958			
Dec.	154,007	272,375	429,299
Totals[3]	1,622,320	2,448,917	4,954,554
1959			
Jan.	190,392	263,105	479,019
Feb.	121,716	258,250	312,284
Mar.	173,881	341,218	412,533
April	159,950	296,384	427,227
May	198,126	358,087	474,820
June	188,158	346,231	441,052
July	186,378	173,760	258,935
Aug.	.....	.....	.....
Sept.	.....	.....	.....
Oct.	.....	.....	.....
Nov.	118,860	180,927	216,063
Dec.	177,017	306,303	452,426
Totals[3]	1,341,572	2,607,339	536,688



ZINC-BASE CASTINGS

(Shipments of castings—1000 pounds[1])

	Shipments—Total	Shipments—For Sale	Unfilled Orders[2]
1957	669,775	431,509	.....
1958			
Nov.	56,239	39,584	57,864
11 mo.	525,487	363,235	.....
Dec.	64,574	46,236	56,756
Total	590,071	409,471	.....
1959			
Jan.	55,439	38,661	61,192
Feb.	51,368	35,478	57,437
Mar.	57,600	40,700	62,657
Apr.	57,325	40,127	55,916
May	60,656	43,920	62,224
June	56,128	40,226	54,097
July	46,756	34,806	52,677
Aug.	46,586	34,682	56,090
Sept.	58,144	40,397	60,953
Oct.	59,214	42,584	57,814
Nov.	46,720	37,410	58,076
11 mo.	595,914	428,801	.....

CONSUMPTION*—Gross Tons

	Cupola	Air	Electric
1957	4,160,891	218,178	246,851
1958			
June	262,883	12,098	15,549
6 mo.	1,619,040	81,662	67,817
July	239,140	10,550	12,140
Aug.	247,428	13,196	32,309
Sept.	300,173	14,994	27,759
Oct.	300,115	17,393	34,273
Nov.	287,013	14,862	31,397
Dec.	321,741	16,610	25,450
Total	3,314,652	169,267	231,145
1959			
Jan.	321,302	17,113	36,783
Feb.	324,876	17,960	37,414
Mar.	353,985	20,025	42,464
Apr.	366,378	21,997	41,597
May	358,192	20,424	40,812
June	366,136	20,390	39,867
6 mo.	2,090,869	118,509	238,937

MAGNESIUM CASTINGS

(Shipments of castings—1000 pounds[1])

	Shipments—Total	Shipments—For Sale	Unfilled Orders[2]
1957	30,322	28,452	.....
1958			
Nov.	2,754	2,552	4,063
11 mo.	25,970	22,718	.....
Dec.	2,806	2,306	5,115
Total	28,776	25,024	.....
1959			
Jan.	2,291	2,086	5,001
Feb.	2,249	1,995	4,637
Mar.	2,129	1,924	4,465
Apr.	2,455	2,213	4,787
May	2,370	2,093	5,102
June	2,484	3,207	4,664
July	2,265	1,875	3,995
Aug.	2,243	1,753	3,809
Sept.	2,263	1,832	3,823
Oct.	2,436	1,890	3,501
Nov.	2,023	1,628	3,281
11 mo.	25,208	22,496	.....

*Source: U. S. Dept. of Interior, Bureau of Mines. **Source: American Iron & Steel Institute. [1]Source: Bureau of the Census. [2]For sale only. [3]Monthly figures do not add up to totals shown because of unreported monthly revisions.

DO IT YOURSELF

WHITEHEAD'S X-TRUDE-A-SEAL

Costs less than any packaged preformed strips

Stoller Chemical Co.'s X-TRUDER extrudes up to 45 ft. of seal strip per minute!

YOU'RE ON THE TARGET when you do it the X-Trude-A-Seal way! —

- Make your strips daily as you need them
- Re-extrude all leftovers the next day to desired sizes
- Sizes from ¼" to ¾" diameter

- Will not dry out or crack
- Economical — eliminates waste of material
- Applies faster than preformed extruded strips
- Reduces chipping, grinding, porous metal, leakers
- Eliminates uneven casting walls, excessive fins

Of course, Joint Seal is available for hand rolling, hand gun, or use with Stoller X-Truder

***FIND OUT HOW MUCH YOU CAN SAVE** — contact your distributor . . . or write direct*

Whitehead Brothers COMPANY

Established 1841

NEW YORK OFFICE
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NEW ENGLAND OFFICE
75 Westminster St., Providence 1, R. I.

Manufacturers of

LYQUAGRIP
Ready-to-use core paste

DUO RESIN
Binder for baking with controlled oven temperatures

JOINT SEAL
Plastic compound for perfect sealing

LYQUAFACE
The liquid sand grain coating

DOB-IT
Ready-to-use core mudding compound

Circle 579 on Page 53

BQ AUTOMATIC

★ cycles in 8 secs

★ makes harder moulds

★ costs less—
produces more

BQ Machines are available in different sizes and with various stripping arrangements. All models are suitable for Tight Flasks or Pop-offs, two at a time or singly.

Technical representation service and all spares Now available in USA & CANADA.

write today

for full particulars of these and other models

BRITISH MOULDING MACHINE COMPANY LIMITED
FAVERSHAM KENT ENGLAND

TOUGH MATERIAL SPECIALIST—

The Model 12B Michigan

CHROME and CARBORUNDUM ORE are unloaded fast by this 16 cu ft Model 12B. Owner: New York Central RR. Location: Jersey City.

Like all Michigans, the 12B has efficient all-Clark power train, including power-shift transmission, torque converter, planetary-wheel drive axle.

BROKEN GLASS reclaiming is the prime use of this Michigan Model 12B owned by Fairmount Glass Works, Indianapolis, Indiana.

BROKEN TILE, 400 tons per 8 hour day—that's the output of the two 12B's owned by Oconee Clay Products Co., Milledgeville, Georgia.

DOLOMITE, charged directly into red-hot open hearths, is this Michigan's tough, but successful assignment in this Illinois steel plant.

COKE, used by American Brake Shoe Co, Buffalo, is dumped into hopper. Note cramped quarters easily negotiated by the Model 12B.

FERTILIZER, tight-packed and hard to dig, yields to powerful Virginia-owned Model 12B. Note the heaped bucket, a "trademark" of all Michigans.

Your "tough jobs," too, are made to order for Michigan Tractor Shovels. Model 12B capacity is 3,000 lbs, buckets are available to carry from 6 to 27 cubic feet. Write for details.

Michigan is a registered trademark of

CLARK EQUIPMENT COMPANY
Construction Machinery Division

CLARK EQUIPMENT

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Canadian Clark, Ltd.
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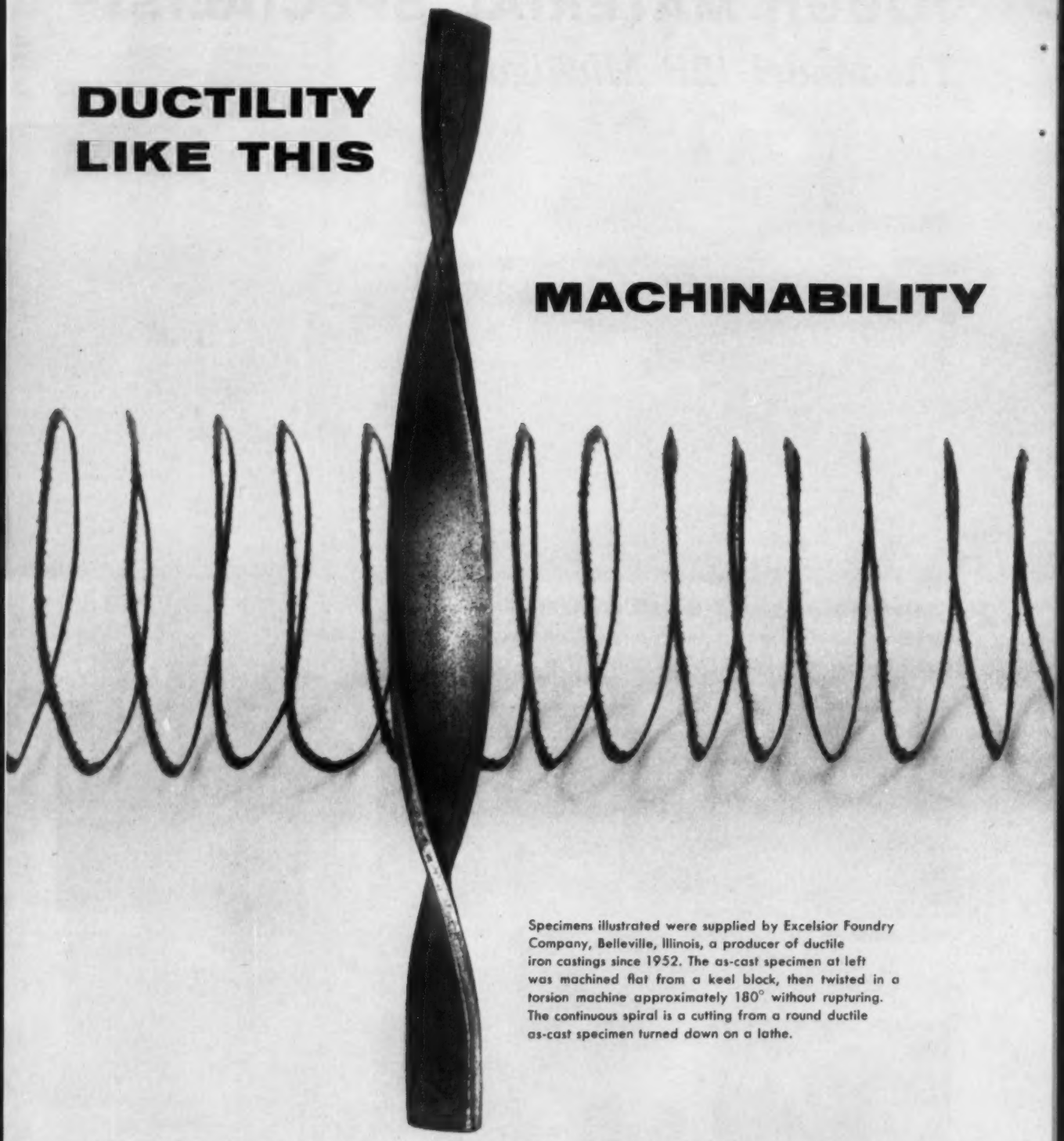
Circle 581 on Page 53

DUCTILITY LIKE THIS

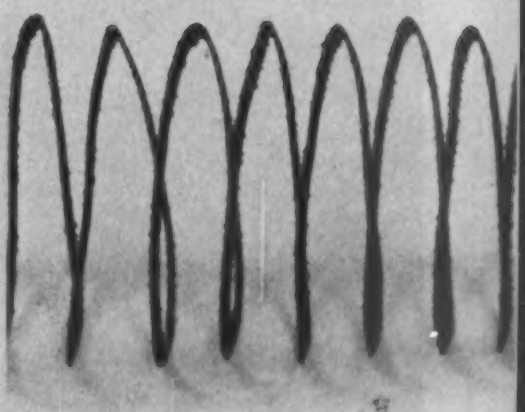
MACHINABILITY



Specimens illustrated were supplied by Excelsior Foundry Company, Belleville, Illinois, a producer of ductile iron castings since 1952. The as-cast specimen at left was machined flat from a keel block, then twisted in a torsion machine approximately 180° without rupturing. The continuous spiral is a cutting from a round ductile as-cast specimen turned down on a lathe.

LIKE THIS

. . . when Chateaugay Pig Iron is the base metal in ductile iron castings



The finest spheroidal graphite or ductile types of cast iron possess many of the engineering advantages of steel—ductility, high strength, toughness, machinability, heat- and wear-resistance—when they are produced with Chateaugay Pig Iron.

High total carbon and unusually low manganese, phosphorus, and sulphur content suit Chateaugay perfectly for production of high ductility as-cast grades of ductile iron.

Chateaugay's consistently uniform chemical analysis is an important factor in achieving as-cast properties, especially ductility. Freedom from excessive amounts of subversive elements assures the formation of graphite nodules. Additionally, the inherently excellent properties of Chateaugay Pig Iron are maintained in the ductile form.

Castings produced with Chateaugay are of consistently high quality with close grain and uniform structure. And, because it can be cast without excessive shrinkage, adjoining light and heavy sections are filled completely. This assures strong, flaw-free castings accurate to patterns and shapes.

To assist you in using Chateaugay to best advantage, Republic provides a complete foundry engineering service covering all phases of foundry operation—metallurgical, molding practice, gating, risering, and cupola practice. Contact your Republic representative, or mail the coupon for prompt service.

REPUBLIC STEEL

Producers of Industry's Most Complete Line of Merchant Pig Irons

REPUBLIC STEEL

REPUBLIC STEEL CORPORATION
DEPT. FO-9106
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

☐ Have a Foundry Service Engineer call
☐ Send more information on Chateaugay

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

NEW

cup wheels with "built-in guard"

for all rough grinding applications

- *extra strong*
- *break resistant*
- *positive mounting*
- *no work interference*

Here's a new, portable cup wheel by CARBORUNDUM that offers outstanding safety and performance features for all rough grinding applications in steel mills, foundries, welding shops, etc. The "built-in" guard consists of a one-piece combination steel back and prong-type bushing molded into the fast-cutting resinoid bond. It is easy to mount, eliminates heavy conventional safety guards, and does not interfere with the work piece.

ESPECIALLY DESIGNED FOR USE IN

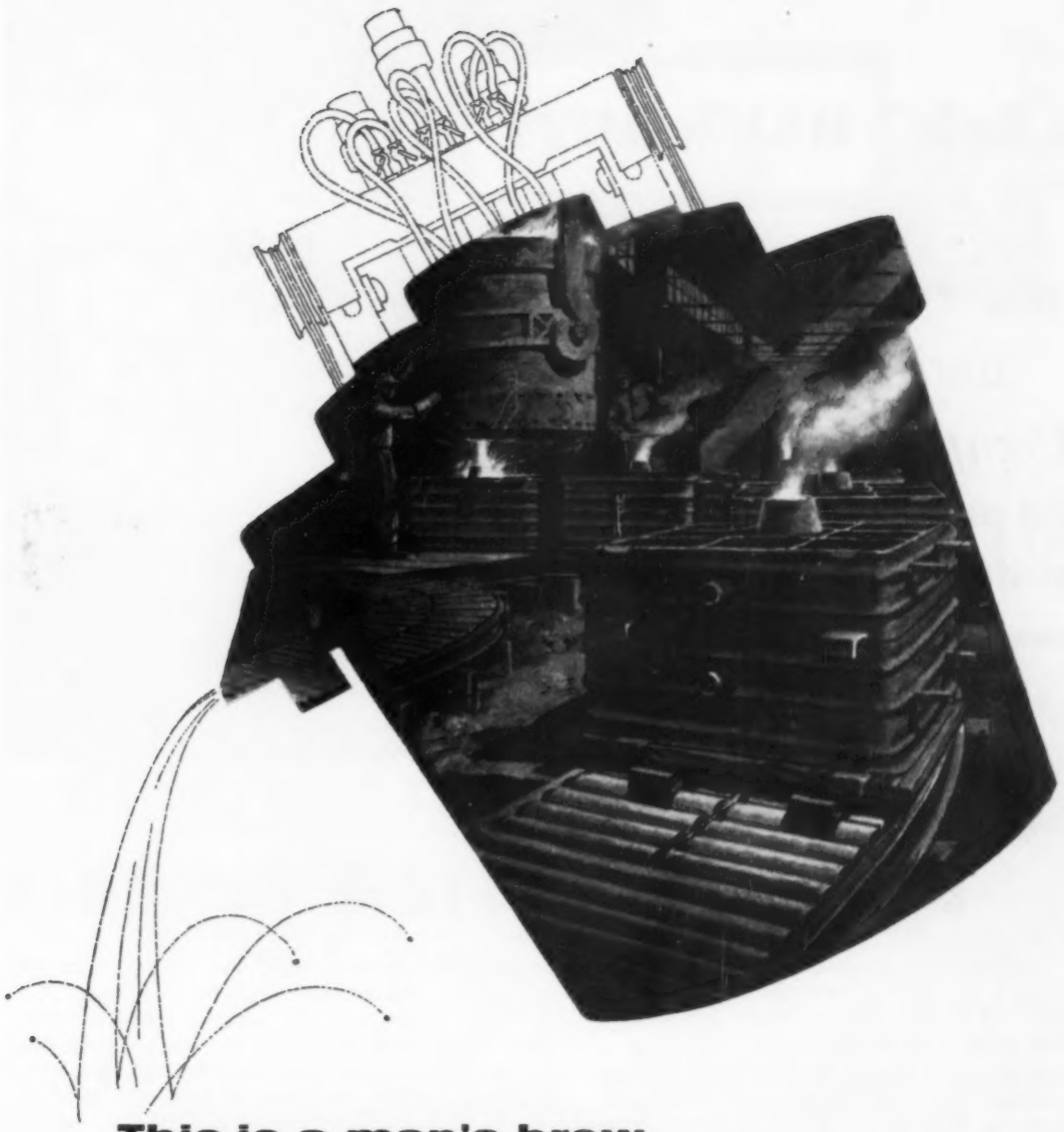
- *STEEL MILLS*
- *FOUNDRIES*
- *WELDING SHOPS*

WRITE for more information about portable Cup Wheels with "built-in guard" form A-1523.

SEND your request to The Carborundum Company, Dept. **F-81-02,** Niagara Falls, New York.

CARBORUNDUM

Circle 582 on Page 53



This is a man's brew

Moving tons of molten metal through a foundry's tough production schedule is a job for *men* . . . and *MAN-SIZED* conveyor equipment skillfully engineered. For two generations Logan Foundry Conveyors have more than met this challenge.

"The Man from Logan" can help you, too. He offers one of the few *complete* conveyor lines in the industry. He selects freely from a full range of modern power and gravity equipment to design the one best system for your foundry. Gravity itself becomes a better power source through the skill of your Logan engineer.

"The Man from Logan" is your assurance of the *one right* conveyor at the lowest cost possible. There is no reason to accept less – call or write us today for a prompt visit from an expert . . . "The Man from Logan."

"The Man from Logan"

Logan Conveyors

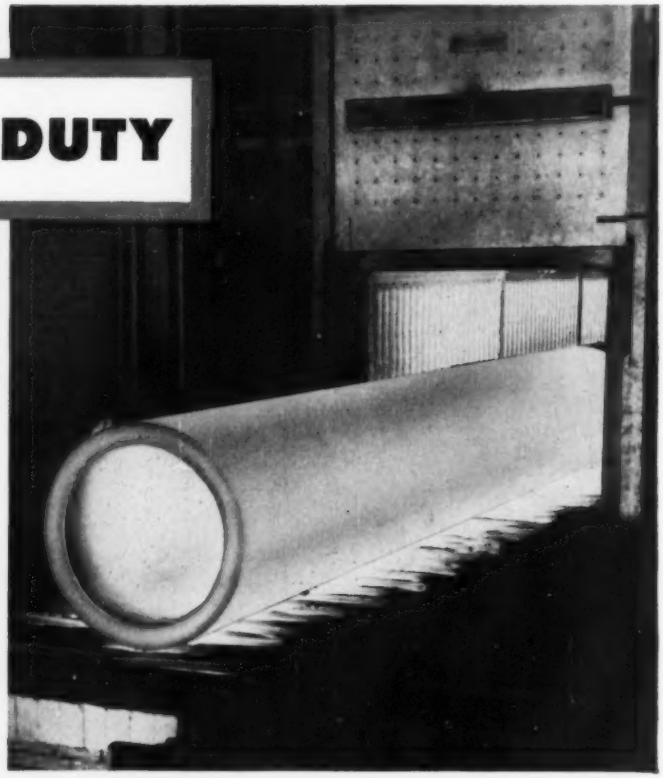
LOGAN CO., 580 CABEL ST., LOUISVILLE 6, KY.

Circle 583 on Page 53

Ask HEVI-DUTY

Sandusky Foundry and Machine Company did...

and now heat treats centrifugal castings of carbon and alloy steel at controlled, uniform temperatures up to 2050° F. with a



Sandusky Foundry and Machine Co. selected this Hevi-Duty Electric Car Bottom Furnace, rated at 2050° F. for their heat treating requirements. Casting being heat treated here weighs 13,700 lbs.

HEVI-DUTY CAR BOTTOM FURNACE

When your heat treating applications demand *quality production at uniform controlled temperatures*, Hevi-Duty can supply either electric or fuel-fired furnaces to meet your requirements.

For example: At Sandusky Foundry and Machine Co., Sandusky, Ohio, centrifugal steel castings up to 50 inches in diameter by 33 feet in length have been heat treated in a Hevi-Duty Electric Car Bottom Furnace. This furnace provides accurately controlled temperatures to 2050° F. in its 6′ x 6′ x 34′ long chamber. They use it to normalize, temper and anneal steel and stainless steel castings. Parts are either air cooled or water quenched.

The Hevi-Duty Car Bottom Furnace features five zones of temperature control, and by placing a dividing wall between the three forward and two rear zones, two separate loads with different temperature ranges can be treated simultaneously. Heating elements in side and end walls, ceiling, door and car bottom, plus three removable air-circulating fans help provide uniformity of temperature.

Whatever your particular heat treating application, there's a Hevi-Duty furnace designed to do the job. Car Bottom Furnaces are available with many arrangements and optional features—single or double end, retort type, controlled atmosphere, forced-air convection and others. Be sure to contact Hevi-Duty first for your heat processing equipment needs.

HEVI-DUTY

A DIVISION OF BPC BASIC PRODUCTS CORPORATION

ASK HEVI-DUTY

for more information on electric or fuel-fired heat treating furnaces. Car Bottom Furnaces are fully described in Bulletin 644R.

HEVI-DUTY ELECTRIC COMPANY, MILWAUKEE 1, WISCONSIN

Industrial Furnaces and Ovens, Electric and Fuel • Laboratory Furnaces • Dry Type Transformers • Constant Current Regulators

Circle 584 on Page 53

POSITIVE DUPLICATION – EVERY TIME!

You can depend on a rubber stamp to print identical information time after time after time. You can also depend on the Positive Duplication of these portable Ⓟ°Wheels . . . and *all* CINCINNATI Ⓟ GRINDING WHEELS.

HERE'S HOW (PD) IS ACHIEVED

To supply you with wheels of uniform excellence, Cincinnati's unique Ⓟ manufacturing process is unvaryingly regulated by 36 separate quality controls . . . For example humidity and temperature of the Wheel Mold Room are kept at the same levels every hour of every day throughout the year—an essential safeguard of Ⓟ uniformity.

RESULT: DEPENDABLE PERFORMANCE

Each Ⓟ reorder wheel gives you exactly the same good job as the original. Production goes up and stays up. Costs go down and stay down. This is the promise—and performance—of Positive Duplication.

CALL CINCINNATI TODAY

Solve your snagging problems with the help of Cincinnati's factory-trained specialists. Their wide experience in snagging operations of all kinds is at your service. Just call your CINCINNATI Ⓟ GRINDING WHEEL Distributor or contact Cincinnati Milling Products Division, Cincinnati 9, Ohio.

PD POSITIVE DUPLICATION

CINCINNATI®

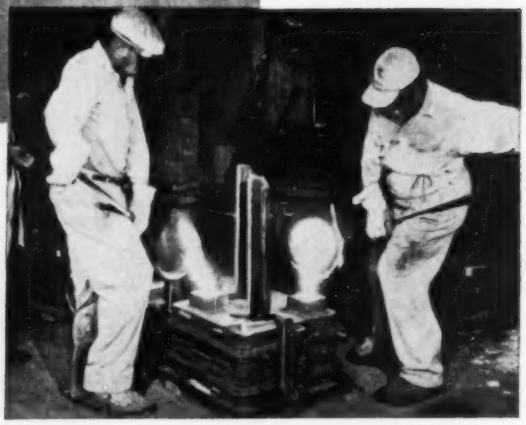
GRINDING WHEELS

°Trade Mark Reg. U.S. Pat. Off.

A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

Circle 585 on Page 53

HOEGANAES Sponge Iron MELTING STOCK replaces high-grade, high-cost ingot iron after extensive test evaluations



Stanley Foundries, Inc., now specifies HOEGANAES MELTING STOCK in stainless production for all grades previously specifying high-cost ingot iron

Mr. John R. Small, Chief Metallurgist of Stanley Foundries, Inc., Huntington Park, Cal., defined their evaluation this way, "Shortly after test production of our 3XX series stainless, Stanley Foundries standardized on Hoeganaes Melting Stock. We feel that Hoeganaes Sponge Iron has the following advantages compared to high-cost ingot iron."

- "Approximately one-third less cost.
- "Much cleaner and free from rust.
- "Scrap falls in better—does not weld—hence faster heats.
- "More consistent oxidizing effect.

In summation, Mr. Small states, "Hoeganaes Melting Stock is as nearly perfect for handling and melting-in without bridging as any stock we have handled."

Why not contact your nearby Hoeganaes Service Engineer and put Hoeganaes to your test—make your own evaluation?

HSIC

HOEGANAES

HOEGANAES SPONGE IRON CORPORATION

RIVERTON, NEW JERSEY

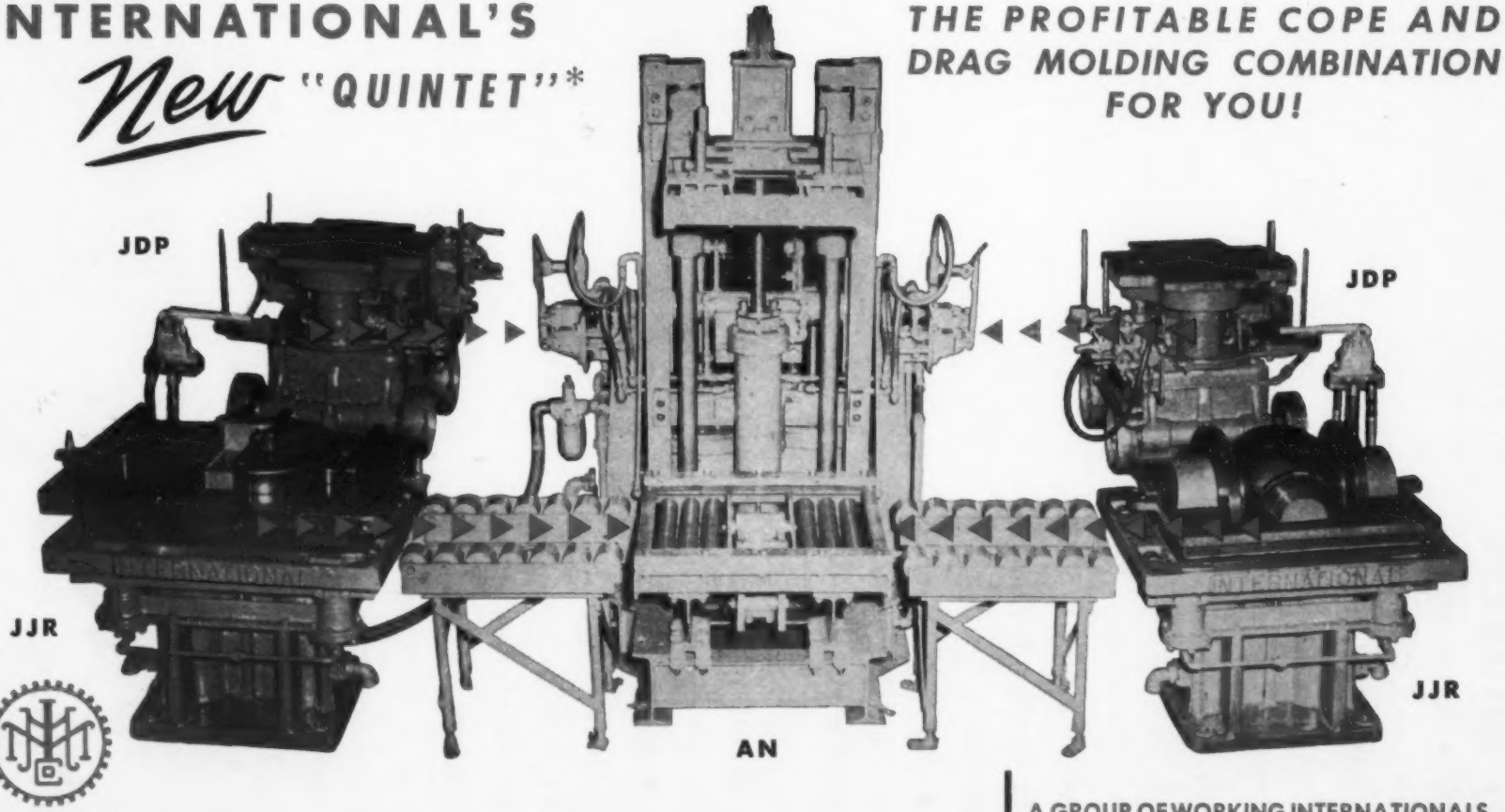
SALES REPRESENTATIVES IN PRINCIPAL CITIES: Birmingham, Chicago, Cincinnati, Cleveland (Fostoria), Edmonton (Alberta, Canada), Los Angeles, Minneapolis, New England (Elmira, N.Y.), Philadelphia (Riverton, N. J.), Pittsburgh, San Francisco, St. Louis

Circle 586 on Page 53

Circle 587 on Page 53→

INTERNATIONAL'S *New* "QUINTET"*

THE PROFITABLE COPE AND DRAG MOLDING COMBINATION FOR YOU!



JJR—DOUBLE JOLT MACHINE

Has double jolt feature and is sturdily built to give positive ram throughout core or mold. Jolt capacities range from 750 lbs. to 12,000 lbs.

JDP—COPE MACHINE

Adaptable to large range of work suitable to pin lift style and readily adjustable. Exclusive feature is its positive jolt and true ram accomplished by use of double jolt section combined in one integral part. Will handle loads from 750 lbs. to 3000 lbs.

AN—TURNOVER and DRAWING MACHINE

For clamping and turning over core boxes or flasks and for drawing the core or mold. Easily handles hard-to-draw, short runs and many different sized jobs. No rigging time is required. Capacity—750 lbs. to 10,000 lbs.

A GROUP OF WORKING INTERNATIONALS

These individual machines are in combination to give you a complete cope and drag molding setup for both short and long production runs.

Investigate International's New Working Quintet Today! Just write us a note telling your cope and drag sizes, and our engineers will plan the best combination for your particular needs. NO OBLIGATION!

*International's System, illustrated by the "Quintet" shows just one of the many possible combinations.

INTERNATIONAL MOLDING MACHINE CO.
LA GRANGE PARK, ILLINOIS

Yale tractor shovels

are setting new performance standards wherever they are used. Compare Yale power against any other in its field. Only Yale gives you a torque converter and fully automatic transmission with a 72-hp. 6-cylinder engine. Compare Yale action! 2500-lb. carry capacity bucket. Exclusive 45° bucket tipback for faster loading and minimum spillage. 6 ft. dumping clearance—highest in the field. Compare Yale safety! Safety-curve lifting members never rise alongside the operator. Front and rear working lights for additional security. Compare Yale design! Rugged, simplified, more efficient. Brakes and electrical system sealed. 10-ply tires. Many parts interchangeable with Yale Gas trucks. Compare these features with a demonstration in your own plant. See why you'll save time and money.

For full information, or a demonstration, call your Yale representative, or send for free brochure #5255A to The Yale & Towne Mfg. Co., Materials Handling Div., Phila. 15, Pa., Dept. YT-4.

Yale Materials Handling Division, a Division of The Yale & Towne Manufacturing Company. Manufacturing Plants: Philadelphia, Pa., San Leandro, Calif., Forrest City, Ark. Products: Gasoline, Electric, Diesel and LP-Gas Industrial Lift Trucks Worksavers · Warehousers · Hand Trucks · Industrial Tractor Shovels Hand, Air and Electric Hoists.

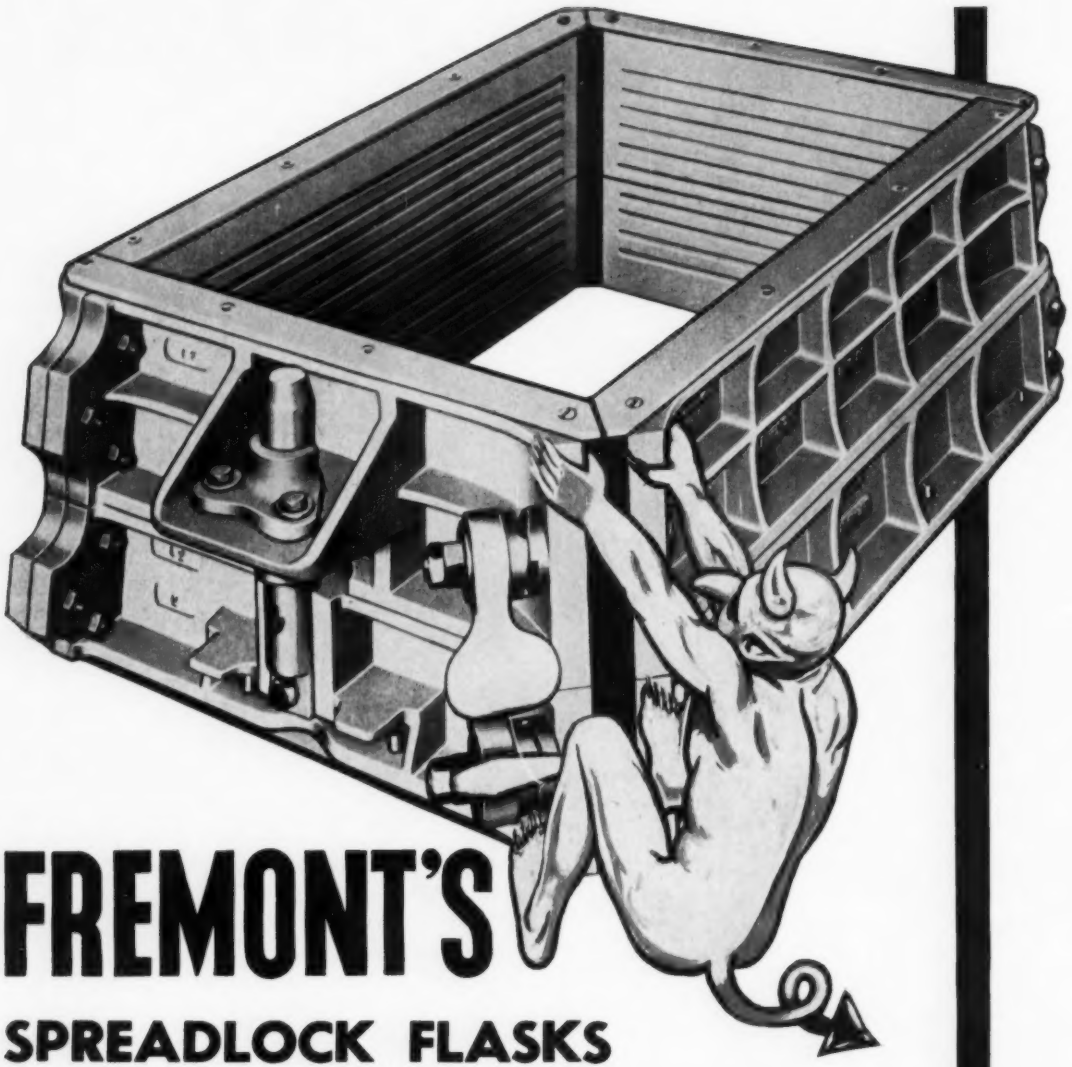
YALE®

INDUSTRIAL LIFT TRUCKS
TRACTOR SHOVELS · HOISTS

YALE & TOWNE

Circle 588 on Page 53

YALE



FREMONT'S

SPREADLOCK FLASKS

HAVE TREMENDOUS CORNER STRENGTH

The flask itself is made of magnesium. This gives it strength and lightness. Cams are hardened steel forgings; this assures extra strength where it is needed. Locks, pins and cams are accurately machined; this provides a flask that can be used over and over again for exacting work.

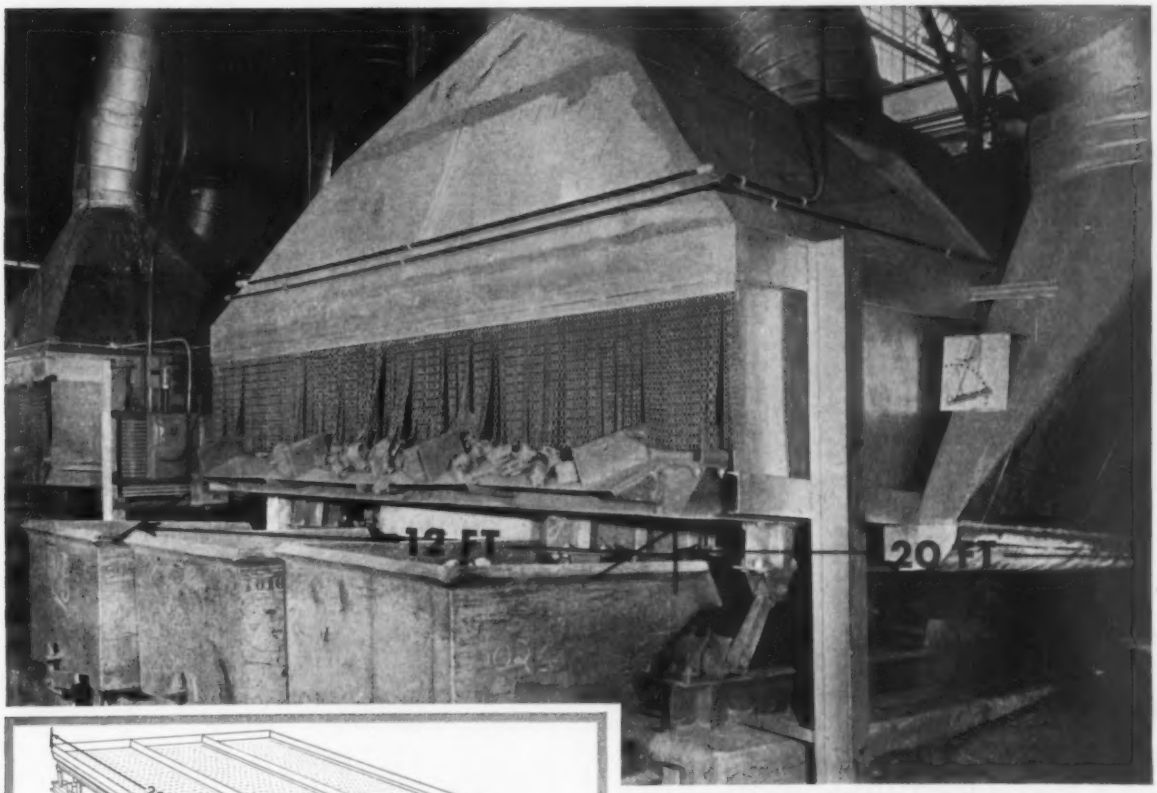
The new FREMONT FLECKS-O JACKET has been developed particularly to eliminate shifts and runouts. Ask us about prices and delivery.

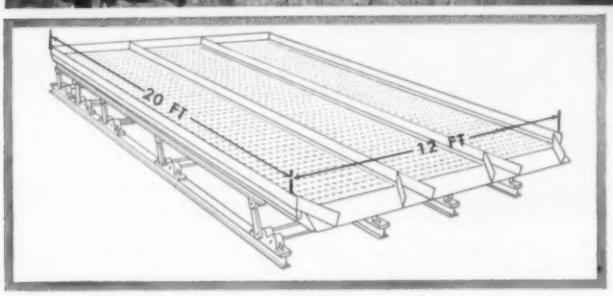
The Fremont Flask Co., Fremont, O.

Circle 589 on Page 53

12-ft. wide oscillating conveyors

take castings through air quenching in 3600-lb. batches





POSITIVE ACTION! NATURAL FREQUENCY!
Like all Link-Belt oscillating conveyors (Coilmounts for medium duty, Flexmounts for light duty), the mammoth, heavy-duty Torqmounts at this installation operate with a combination of natural frequency and positive action. Natural frequency results in low operating requirements and minimum stress on parts under load. Positive action of the unit's eccentric drive provides a constant, uniform conveying action . . . even under surge loads which often dampen-out other types of vibratory conveyors.

■

Huge LINK-BELT Torqmount conveyors assure uniform cooling at large midwest automotive foundry

Normal widths of Link-Belt oscillating conveyors range up to 48 inches. But to meet the needs of this air quenching job, Link-Belt custom-designed three 12-ft. wide giants.

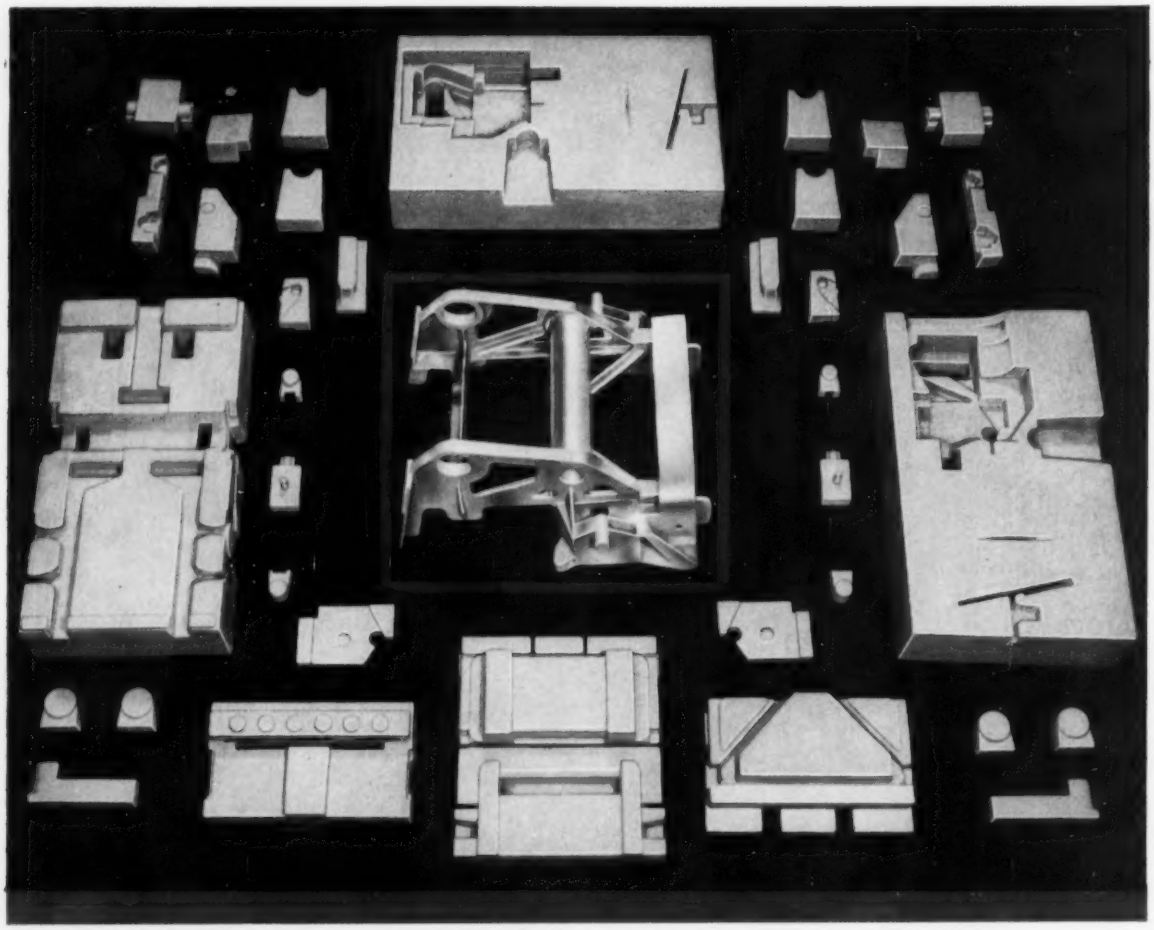
As the red hot castings ride to the air chamber, oscillating action spreads the batch evenly over the perforated plate Torqmount bed . . . voids are minimized. Result: maximum exposure to air, uniform quenching.

For the best in light, medium or heavy-duty conveying, call your nearest Link-Belt office or authorized stock-carrying distributor. Or write for Book 2744. It contains complete data on all three types of Link-Belt oscillating conveyors: Torqmount, Coilmount, Flexmount. 18,305

LINK-BELT

OSCILLATING CONVEYORS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses and District Sales Offices in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World.



How RCI FOUNDREZ CORE BINDER Helped AMERICAN BRAKE SHOE Meet MIL-C-21180A

To produce the strong, dimensionally precise, lightweight casting shown above, the Light Metals Department of American Brake Shoe Company in Mahwah, New Jersey called upon two of the latest advances in metalworking technology . . . Ductaluminum, a relatively new and stronger aluminum alloy and RCI's FOUNDREZ liquid amino-aldehyde core binder. Used together, they now make it possible for foundries to meet military specifications in castings of this complex nature. ■ Thirty-six individual cores (see illustration) are required to produce this jet canopy casting. And why does American Brake Shoe choose RCI FOUNDREZ for this application? Four factors are involved: 1. *RCI's liquid amino-aldehyde core binder provides better binder distribution in the core sand which contributes to exact casting dimensions and keeps surface defects at a minimum.* 2. *The advantage of dielectric baking, and the high core strength obtained, increases core production and speeds core handling.* 3. *Excellent core knockout and collapse qualities, at the lower pouring temperatures of aluminum, speed production and reduce the cost of finishing.* 4. *RCI's reputation for on-time delivery and prompt technical service.* ■ If you are pouring metal castings at temperatures below 2700° F, we suggest you investigate the improved core properties offered by RCI's FOUNDREZ liquid amino-aldehyde binder. Reichhold will deliver this unique resin to you from seven convenient shipping points in tank cars, tank trucks or drums. Write today for Technical Bulletin F-2-R for full data on RCI's FOUNDREZ 7600 series.

Creative Chemistry . . .
Your Partner in Progress

RCI

REICHHOLD
FOUNDRY PRODUCTS

FOUNDREZ *Synthetic Resin Binders*
COROVIT *Self-curing Binders*
CORCIMENT *Core Oils*
CO-RELEES *Sand Conditioning Agent*
REICOTE *Sand Processing Agent*

REICHHOLD CHEMICALS, INC., RCI BUILDING, WHITE PLAINS, N. Y.

Use These Cards . . .

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- For more information on anything advertised in this issue
- For further data on products described in the Equipment and Supplies section (Page 117)
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- To request extra copies of editorial articles

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77	431	461	491	521	551	581	611	641	671	701	731	761	791	821	851
402	432	462	492	522	552	582	612	642	672	702	732	762	792	822	852
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417	447	477	507	537	567	597	627	657	687	717	747	777	807	837	867
418	448	478	508	538	568	598	628	658	688	718	748	778	808	838	868
419	449	479	509	539	569	599	629	659	689	719	749	779	809	839	869
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422	452	482	512	542	572	602	632	662	692	722	752	782	812	842	872
423	453	483	513	543	573	603	633	663	693	723	753	783	813	843	873
424	454	484	514	544	574	604	634	664	694	724	754	784	814	844	874
425	455	485	515	545	575	605	635	665	695	725	755	785	815	845	875
426	456	486	516	546	576	606	636	666	696	726	756	786	816	846	876
427	457	487	517	547	577	607	637	667	697	727	757	787	817	847	877
428	458	488	518	548	578	608	638	668	698	728	758	788	818	848	878
429	459	489	519	549	579	609	639	669	699	729	759	789	819	849	879
430	460	490	520	550	580	610	640	670	700	730	760	790	820	850	880

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428	458	488	518	548	578	608	638	668	698	728	758	788	818	848	878
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FIRST CLASS
Permit No. 36
CLEVELAND, OHIO

BUSINESS REPLY MAIL
No Postage Stamp Necessary if Mailed in the United States
—POSTAGE WILL BE PAID BY—

FOUNDRY
Penton Building
Cleveland 13, Ohio

Reader's Service Dept.

FIRST CLASS
Permit No. 36
CLEVELAND, OHIO

BUSINESS REPLY MAIL
No Postage Stamp Necessary if Mailed in the United States
—POSTAGE WILL BE PAID BY—

FOUNDRY
Penton Building
Cleveland 13, Ohio

Reader's Service Dept.

New H-30 PAYLOADER®

a completely new unit with four-wheel drive

This tractor-shovel is the smallest "PAYLOADER" ever built with 4-wheel drive. In spite of its compact size and modest price, it has the latest improved features and refinements of larger "PAYLOADER" units, and many performance advantages not found in any other machine.

Four-Wheel Brakes: Powerful hydraulic type, and sealed to keep out dust and dirt.

Full Power-Shift Transmission plus torque-converter: Three speed ranges in each direction. All shifts in either direction can be made "on-the-go" with a flick of the fingers — no foot clutching.

Operator Visibility and Safety: New slope-down front end lets operator see bucket-loading action. All moving members are removed from operator's contact. He gets on and off safely with a fixed ladder and hand rails.

Closed Pressure-controlled Hydraulic System: Oil reservoir is closed and pressurized to exclude airborne dirt and dust — includes a cartridge type oil filter and fine-mesh strainer.

Positive Oil Cooling: Separate fan-cooled oil-to-air radiator assures positive cooling of transmission and torque-converter oil.

Maximum Accessibility: Fuel tank and transmission can be checked and filled from ground level. Easy access to battery, engine and other necessary points.

Your Hough Distributor is ready to give you data on this H-30 or any of the other "PAYLOADER" sizes from 2,000 to 12,000 lb. operating capacity. There's a model to meet your bulk material handling needs, indoors or outdoors. He also has complete service and parts facilities, backed by factory service personnel, to keep your "PAYLOADER" investment profitable.

HOUGH, PAYLOADER, PAYMOVER, PAYLOGGER and PAY are registered trademark names of The Frank G. Hough Co., Libertyville, Ill.

77½ H.P. — 1 cu. yd. bucket . . . 3,000 lb. operating capacity

more power, more reach and more dumping height than any comparable machine

HOUGH®

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.
703 Sunnyside Ave., Libertyville, Ill.

——— Send data on new H-30 "PAYLOADER"
——— Send data on other models and attachments

Name _____
Title _____
Company _____
Street _____
City _____ State _____

3-8-3

Circle 592 on Page 53

DoALL SAW BLADE gives you the most sawing for your dollar

Think of it! Here's a precision cutting tool, costing only $2.58, that is capable of cutting 13,000 sq. in. of aluminum. In a typical cost study, No. 355 cast aluminum was cut at 25 sq. in. per minute. Tool cost, based on the actual life of the blade, was only 1/50th of a cent per sq. in.

This gives you some idea of what is happening in metalworking with the new speeds and low tool costs made possible with modern DoALL band machining.

Where else can you get this much cutting for so little tool cost?—And the faster cutting rates reduce direct labor costs, too! The table below gives you typical examples of DoALL Saw Blade performance.

HERE'S THE PROOF!

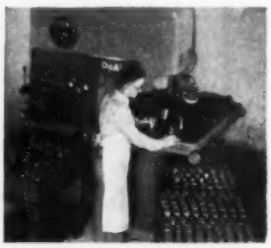
Cost/sq. in.	Material	Sq. in cut/min..	Standard Blade
1/13¢	No. 316 Stainless Steel ¼" Thick	5	¾"—10 Pitch Friction Saw Blade
7/100¢	24 ST Aluminum	140	½"—3 Pitch Buttress ®
1/5¢	Structural Steel	37	1"—10 Pitch Friction Saw Blade
4/10¢	"Kotos" Tool Steel	1.25	¼"—6 Pitch Claw Tooth ®
1/50¢	No. 355 Cast Aluminum	25	½"—3 Pitch Claw Tooth

Lower costs ahead for you

Forward-looking manufacturers are taking advantage of the new economies available through DoALL's advanced techniques. Without obligation, a DoALL specialist will gladly discuss your specific applications and advise you where new methods can be applied to save you money. Call your local DoALL store today.

Zephyr machine trimming high chrome-nickel castings. Tool cost 94¢ per 100 cuts.

Contour-matic band machine sawing aluminum segments. Tool cost 3¢ per 100 pieces.



Contour-matic machine slotting bronze castings. Tool cost 46¢ per 100 pieces.

*½" Wide—
3-Pitch Claw Tooth Blade 10' Long.

Zephyr Band Machine

Utility Contour Machine

Contour-matic® Band Machine

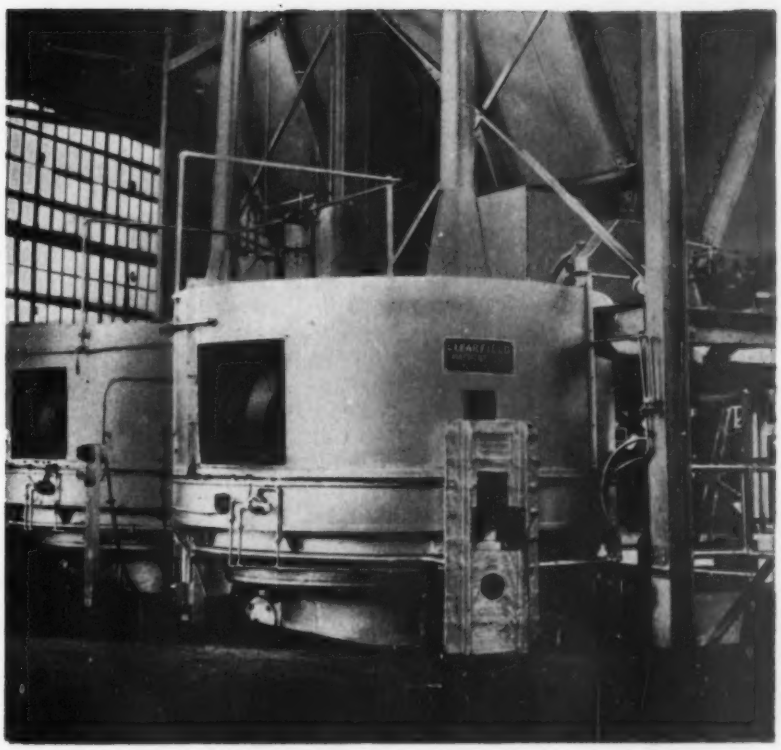
SB-63

THIS IS A TYPICAL DoALL STORE

The DoALL Company, Des Plaines, Illinois

the CLEARFIELD MIXER

mixes, tempers, aerates



the Clearfield Mixer

is engineered, designed and built to prepare sand properly

Properly prepared sand for best foundry results doesn't just happen. It's the natural result of using correct equipment and a matter of precision in controlling all factors involved. Clearfield Mixers always give you properly prepared sand, and there is a Clearfield for every requirement. Write today for Catalog No. 90. Get complete details on the tested efficiency of Clearfield Mixers.

CLEARFIELD
MACHINE COMPANY
CLEARFIELD
PENNSYLVANIA U.S.A.

Circle 594 on Page 53

- GREATER PROTECTED AREA
- BETTER VISION (57.8 mm. Lenses)
- INCREASED VENTILATION
- MORE COMFORTABLE BINDER

Here's the ONLY Foundry Goggle that Fits Over Spectacles!

A larger face mask for greater protection . . . wide vision lenses (57.8 mm. instead of 50 mm. rd.) . . . double the ventilation from a 40 mesh screen — these are important advantages. Even more important is the perfect fit over practically all personal glasses. With a comfortable inner binder this new and improved foundry goggle offers outstanding value.

One-piece easily adjustable headband clips thru metal frame for maintained close fit. Soft *plastic* mask — leather available. Sponge rubber edges, corduroy bound. Standard screw endpieces. NOTE: Companion model is the AO 316 Dust Goggle with 150 mesh screen set behind a 16 mesh screen.

AO 315
Foundry Goggle

Prevent Accidents — Maintain Production with AO Sweatbands

They keep sweat out of eyes and off safety lenses. Prevent accidents due to blurred vision and foreign matter from being carried into eyes, thereby reducing eye dispensary cases. Model 109B weighs only ½ oz. — absorbs many times its weight. 1¾" wide. Adjustable head strap.

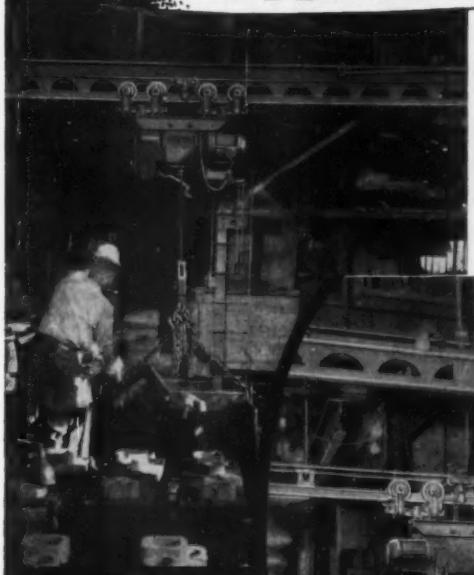
Your nearest AO Safety Products Representative can supply you. Always insist on AO Trademarked Safety Products.

American Optical
COMPANY
SAFETY PRODUCTS DIVISION
SOUTHBRIDGE, MASSACHUSETTS
Safety Service Centers in Principal Cities

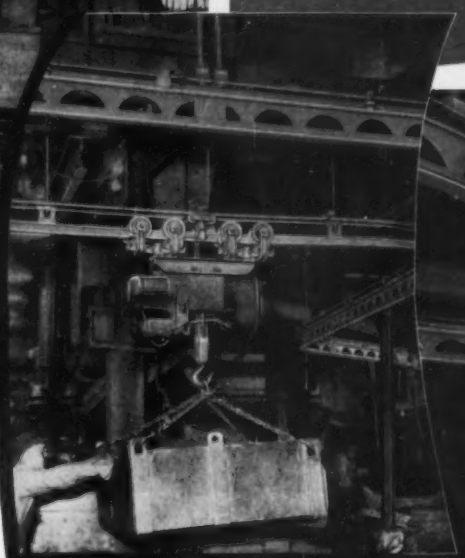
Be Safe for Sure . . . with AO SURE-GUARD Equipment

Circle 595 on Page 53

3 TIME-SAVING STEPS IN HANDLING MOLDS TO SHAKEOUT



Dumping molds into shakeout box at pouring floor in a steel foundry.



Heavy loads are easily pushed on smooth overhead rails.

Molds are quickly emptied into shakeout by tipping box with air (or electric) hoist.

The handling of molds to shakeout is one of the many jobs simplified and speeded by overhead Cleveland Tramrail equipment.

Ten or more molds, depending on size are quickly dumped into a shakeout box at pouring floor. The box is conveyed to the shakeout on smooth overhead Cleveland Tramrail cranes and trackage by an easy rolling carrier that may be either of the hand-propelled or motor-driven type. When over the shakeout, it is quickly tipped and emptied by an air or electric hoist.

The same Cleveland Tramrail equipment also cuts costs in delivering molds to pouring floor and speeding pouring operations.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
3802 East 286th St., Wickliffe, Ohio.

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

Circle 596 on Page 53

GUARANTEED TO OUTWEAR

Any Other Blast Nozzle on the Market . . .

NORBIDE* Pressure Blast Nozzles

These popular Norton Nozzles — lined with boron carbide — the hardest molded material commercially available — are backed by this solid guarantee in effect for over 20 years:

750 Hours with silica sand
1500 Hours with steel shot or grit

Before you buy nozzles, compare the facts. Weigh this solid guarantee against others, then try NORBIDE Boron Carbide Nozzles. You'll find they outwear other nozzles by hundreds of hours.

Here's Why We Can Make This Guarantee:

Actual Comparative Hardness — Nozzle Materials — Knoop Scale	
Ordinary cast iron	150-200
Cemented tungsten carbide	1400-1800
Bonded Al_2O_3 (Alumina ceramic)	2000
NORBIDE Boron Carbide	2800

For full details on cost-cutting NORBIDE Nozzles — write for folder Form 543.

*Trade Mark Reg. U. S. Pat. Off.

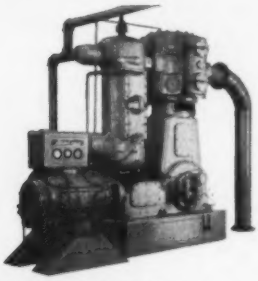
NORTON COMPANY
302 New Bond Street
Worcester 6, Mass.

NORTON
BORON CARBIDE

Making better products . . . to make your products better

NORTON PRODUCTS Abrasives • Grinding Wheels • Grinding Machines • Refractories • Electrochemicals — BEHR-MANNING DIVISION • Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

Which... ATLAS COPCO COMPRESSOR meets your needs best?



AR Heavy-Duty Compressors

More air per horsepower than any comparable compressor! For continuous, full-load operation. "L" angle, 2-stage, double acting. Water cooled. Standard models provide 382 to 3210 cfm free-air delivery at 100 psi; only 76-590 hp required! (Can be supplied for other working pressures on request.)

What's your compressor requirement? Need an installation large enough to provide air for all your needs? Or would a small, compact unit for auxiliary operation solve your immediate problem? Either way—and for a wide range of applications between these extremes—Atlas Copco has the compressor for you!

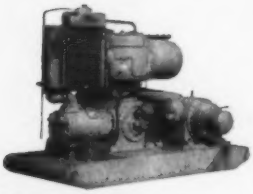
No matter which you choose, you'll get these proven advantages from Atlas Copco:

(1) More air per horsepower—less power consumption than other comparable units!

(2) Really low maintenance (one example—$310 after 10,000 hours' operation)!

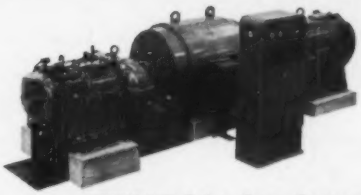
(3) Specifications are guaranteed free-air delivery—you get exactly what you order!

Get all the facts now—and compare! The coupon below will bring you a free catalog. (No obligation, of course.)



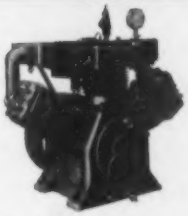
AR-L Heavy-Duty Compressors

Same basic construction as the AR Series, but provided with an air-cooled intercooler and air-cooled radiator for the cylinder water. Fan on compressor flywheel cools radiators. Perfect for arid areas or where difficult to bring in water. Both stationary and skid-mounted models available.



TWIN-AIR Rotary Screw Compressors

Brand new! "Twin-Air" Compressors offer capacities from 6,900 to 19,400 cfm at working pressures up to 115 psi. And, you get completely *oil-free* delivery of air or gas, since no lubrication is required — timing gears maintain small clearances between precision-mounted rotors, eliminating friction (and the necessity of oil) in compression chamber.



CT Air-Cooled Compressors

Stationary, or skid-mounted compressors for use where air demand is between 50 and 300 cfm. Totally air-cooled. Cylinder arrangement designed for smooth, vibration-free operation. Compact, rugged—for continuous, 24-hour trouble-free service. Highly efficient; low on maintenance costs.

ER-6 Heavy-Duty Compressors

New! Fundamental improvements over conventional heavy-duty compressors reduce power requirements (18.3 hp/100 cfm at 100 psi, full load); provide totally enclosed design; and save on floor space. Capacities to 1,140 cfm; standard instruments and safety devices.

ATLAS COPCO
Dept. FO-5, 545 Fifth Avenue,
New York 17, N.Y.

Gentlemen:
Please send me ☐ Short-form catalog ☐ Detailed information on the ____ Series

Name _____ Title _____

Firm _____

Address _____

City _____ Zone _____ State _____

Atlas Copco

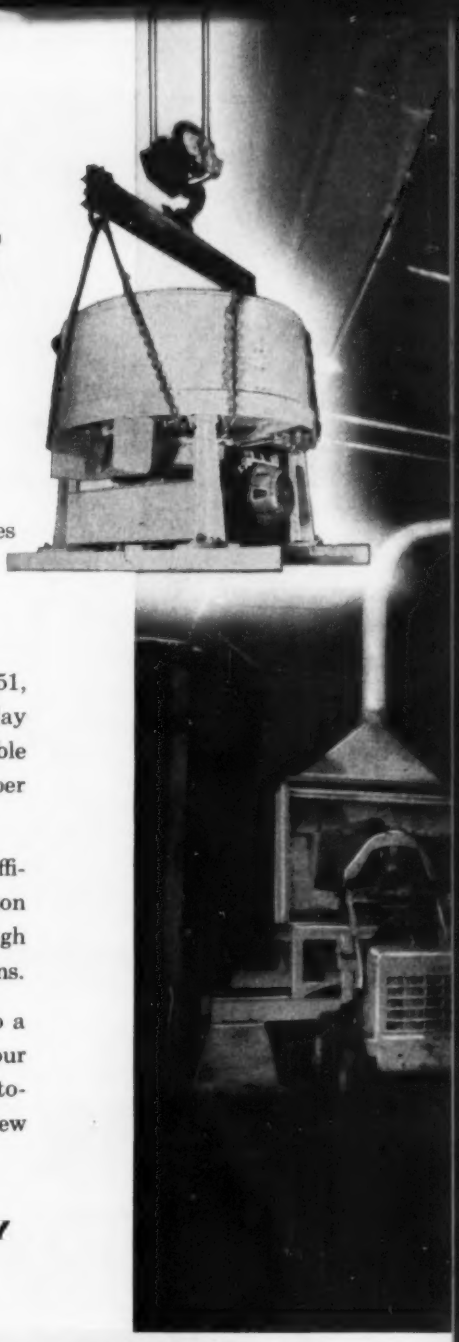
610 Industrial Avenue
Paramus, New Jersey
COlfax 1-6800

930 Brittan Avenue
San Carlos, California
LYtell 1-0375

Circle 598 on Page 53

Would you TRADE IN your present Simpson Mixer for increased foundry profits?

How the Mix-Muller retirement plan benefits Mix-Muller users



Do you own a Simpson mixer comparable to the one described in the tables below? If you do . . . you may be pretty satisfied with your lot. Here's a dependable old machine still turning out production 10, 15, maybe even 20 years after you "wrote off" your investment.

Now, good National customers are *never* wrong. But . . . on June 5, 1951, that machine started to *owe* you money—production dollars. On that day nine years ago, the *Model F* Series Simpson Mix-Muller was made available to offer you 67% greater batch capacity . . . 100% more production per hour . . . 30% more overall mulling efficiency.

Whether you want increased production or greater sand preparation efficiency, these figures mean that every dollar you spend on a new Simpson Mix-Muller is an *investment* which you can expect *returned* to you through more profitable . . . up to 50% more profitable . . . sand preparing operations.

What's more—in 1960 National is prepared to make your transition to a modern F Series Mix-Muller as easy and as economical as possible. If your Simpson was built before 1951, you can *trade it in*—as you would your automobile. Why not call your National agent or write for details on the new *Mix-Muller retirement plan?*

NATIONAL ENGINEERING COMPANY
646 Machinery Hall Bldg., Chicago 6, Illinois
In Canada: 17 Queen St., East, Toronto 1

TRADE UP for increased Foundry Profits

IF YOUR SIMPSON MIXER IS OVER 20 YEARS OLD A MODERN F SERIES MIX-MULLER CAN DELIVER:

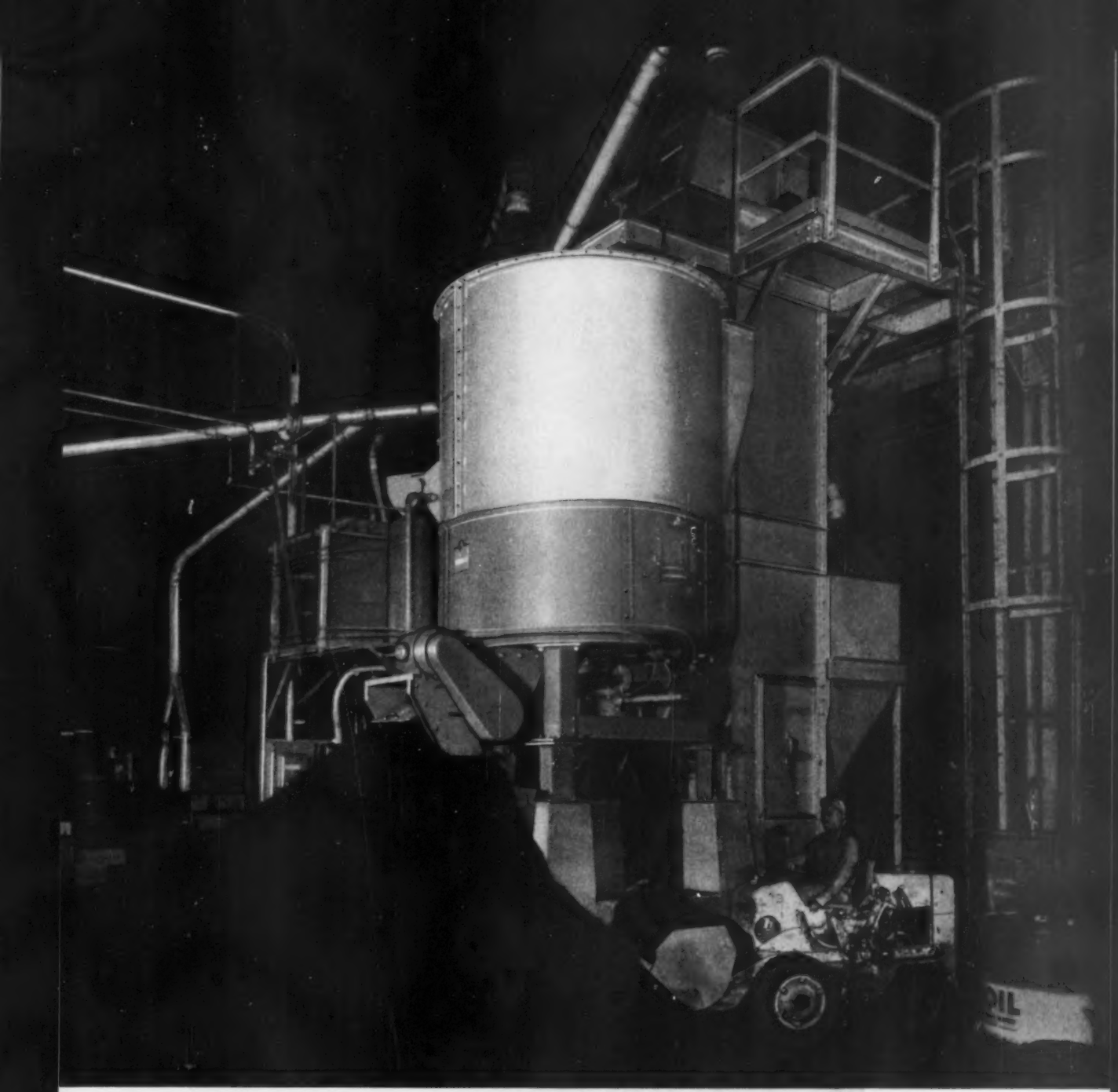
67% greater Batch Capacity
100% more Hourly Production
30% more Mulling Efficiency

THE FOUNDRYMAN'S CHOICE BY 4 TO 1

PERFORMANCE

	1930 Simpson	Model F Mix-Muller	
Batch Capacity	1200 lbs. (max.)	2000 lbs. (min.)	67% more
Output Per Hour (G.I. Mold.)	12 tons (max.)	24 tons (min.)	100% more
Discharge Time	40 seconds	20 seconds	50% less
Mulling Efficiency	On basis of **time** required to develop sand characteristics compatible with modern foundry practice overall 2F efficiency is about . . .		30% greater
Equipment Cost (Per Ton/hr. of Sand Prepared)	Based on present day prices, the 2F Mix-Muller will turn out 100% more sand per hour at an equipment investment amounting to . . .		31% less cost per ton./hr.

MORE PRODUCTION



F280

CONSTRUCTION:

	1930 Simpson	Model F Mix-Muller
Muller Suspension	Rocker arms. 3 weights of mullers 700, 1000, 1600 lbs. Manual adjustment. Non-reversible.	Spring loaded—automatically adjusts to provide more pressure as sand increases in strength. Reversible.
Discharge Door	Hand fitted. No adjustment for wear.	Machined to close tolerance and equipped for wear adjustment. 100% larger opening.
Bearings	Sleeve.	Anti-friction throughout.
Drive	Open bevel, direct connected.	V-belt, self-contained, splash lubricated reducer.

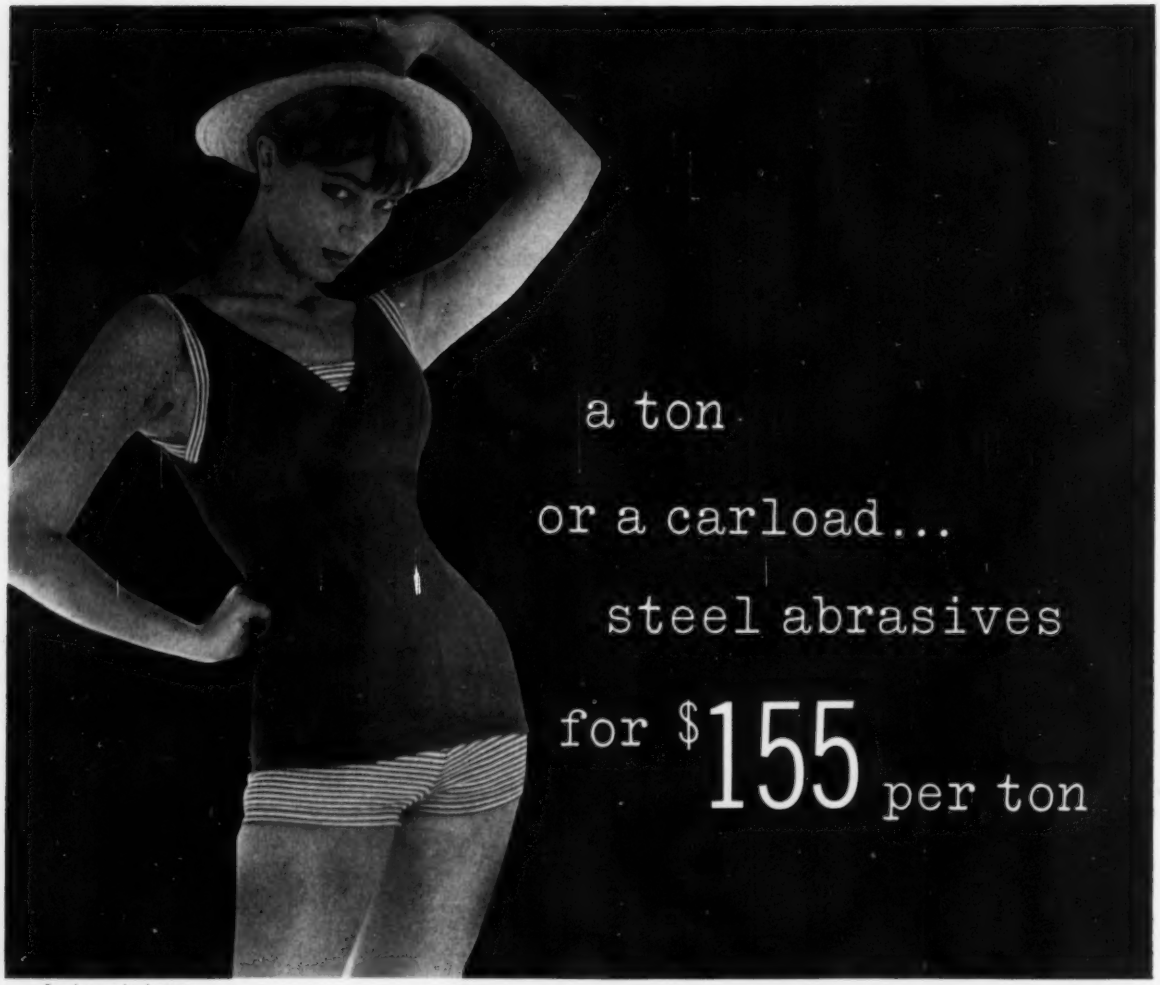
BETTER BUILT

SERVICE AND OPERATING:

	1930 Simpson	Model F Mix-Muller
Lubricate	5 alemite fittings.	"One stop" centralized system for all interior components.
Plow Adjust	Wrench and hammer, from inside crib.	Can be adjusted from **top** of cross head.
Overhaul	Roll up sleeves. Crawl in mixer.	Roll out mullers and/or turret assy. through removable crib section—without dismantling hoods, hoppers, etc.

EASIER TO SERVICE

Circle 599 on Page 53



Beach wear by Jantzen

Here are high quality steel abrasives at a price that means big savings for you! "SEMI-STEEL" sells for $155 per ton — any quantity, a ton or a carload. Shipment right now, too, in any quantity!

In addition to saving $50 to $100 per ton on material cost — you get unexcelled performance. "SEMI-STEEL" cleans most efficiently. It's long lasting. Easy on equipment, too. In fact, its advantages and economies are so substantial, that the nation's leading automotive foundries are now using "SEMI-STEEL".

So there's no need for paying excessive prices for steel abrasives. Check "SEMI-STEEL" and you'll change to "SEMI-STEEL". Write, wire or phone (collect) for complete information and samples.

Inquire, too, about our free engineering service, lab tests and low prices on malleable and chilled abrasives.

METAL BLAST, INC.

872 EAST 67th STREET • CLEVELAND 3, OHIO • Phone: EXpress 1-4274

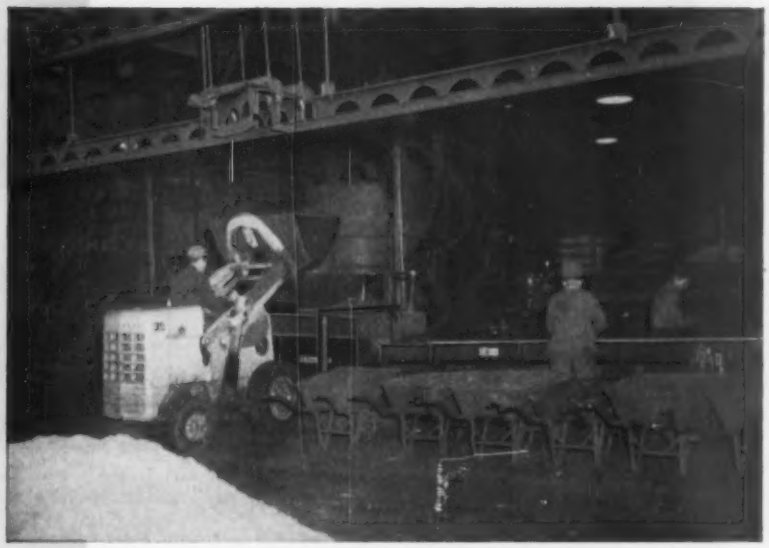
ALSO IN: Chattanooga • Chicago • Cincinnati • Dayton • Detroit • Elberton, Ga. • Grand Rapids • Greensboro, N. C. Houston • Los Angeles • Louisville • Milwaukee • Minneapolis • New York • Philadelphia • Pittsburgh and St. Louis.

"SEMI-STEEL" IS MANUFACTURED AS SHOT AND GRIT TO S.A.E. SPECIFICATIONS. 50 OR 100 LB. BAGS, PALLETIZED IF DESIRED.

Circle 600 on Page 53

OHIO STOVE COMPANY FOUNDRY holds production costs down with SIMPLICITY equipment

At Portsmouth, Ohio, in the modern foundry of the Ohio Stove Co., the SIMPLICITY 4′ x 6′ shakeout and the 30″ x 17′ model VS-12 conveyor (shown here at work) are helping speed operations and reduce unit production costs. First, snap molds are floor dumped; then both castings and sand are scooped and loaded onto the SIMPLICITY shakeout. The castings are then carried on the SIMPLICITY conveyor to the waiting tote boxes. The many plants that are using SIMPLICITY shakeouts are indicative of their foundry-proved superiority. Get complete facts on SIMPLICITY shakeouts, feeders, and conveyors. Write us today.

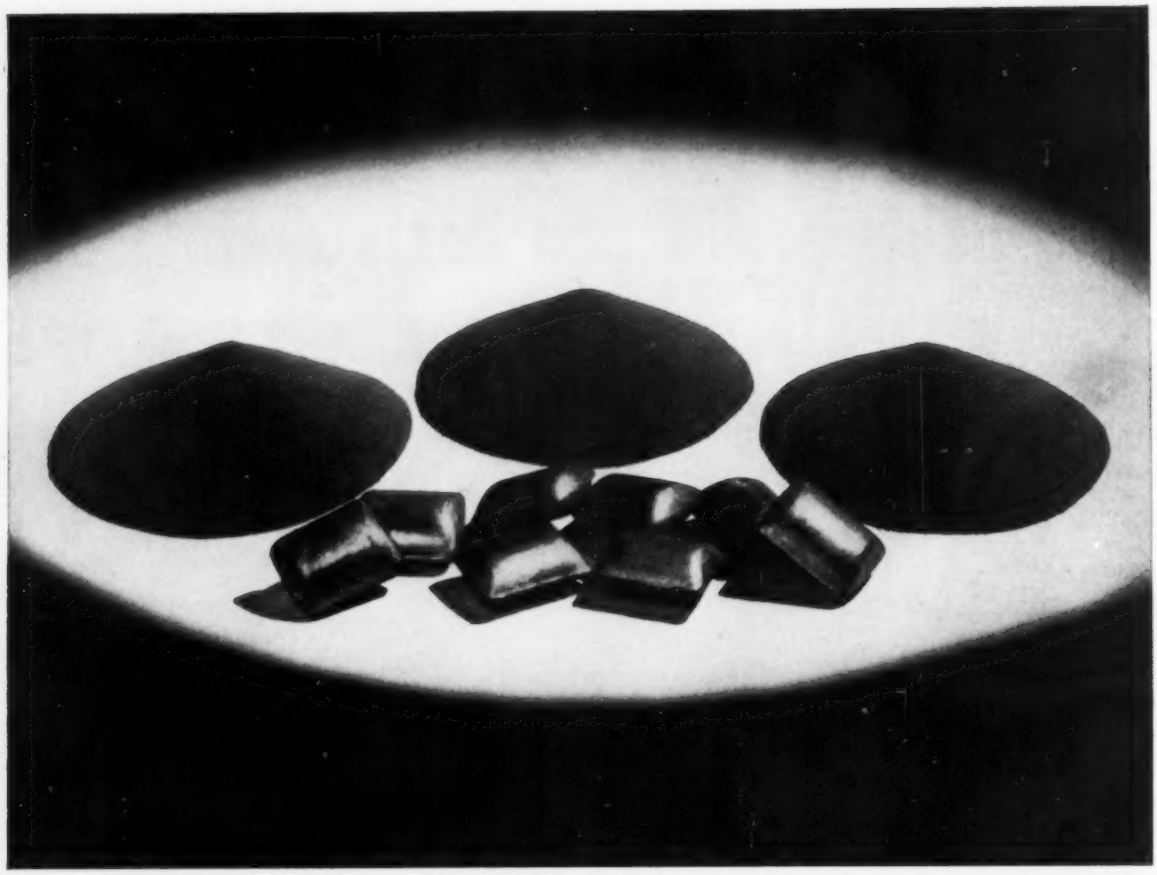


SALES REPRESENTATIVES IN ALL PARTS OF THE U.S.A.
FOR CANADA: Simplicity Materials Handling Limited, Guelph, Ontario
FOR EXPORT: Brown and Sites, 50 Church Street, New York 7, N. Y.

190

Simplicity
TRADE MARK REGISTERED
ENGINEERING COMPANY • DURAND 7, MICHIGAN

Circle 601 on Page 53



Sherritt High-Purity Nickel is available in handy briquettes (1¼" x 1½" x ⅝") and in three grades of powder—Grade C (coarse), Grade F (fine), and Grade S (medium).

nickel as you like it

Nickel as you like it . . . *in purity, in handling ease, and in alloying efficiencies.* Sherritt's unique hydrometallurgical refining process yields nickel powders with a guaranteed purity of better than 99.8%. Available in briquettes and in three grades of powder, Sherritt nickel takes all prizes for handling ease. There are no strips to cut, no unwieldy plates to handle. Alloying is quicker and less troublesome. By disintegrating into smaller agglomerates, Sherritt powders and briquettes go into solution more rapidly with less chilling. This low-chilling property permits alloying additions even at the end of the heat. Sherritt also offers special grades and coated powders.

SHERRITT

FOOTE MINERAL COMPANY is the exclusive sales agent for Sherritt nickel and cobalt in the United States and Canada. For product literature, prices, and delivery information, contact the Foote Mineral Company, 473S Eighteen West Chelten Building, Philadelphia 44, Pa.

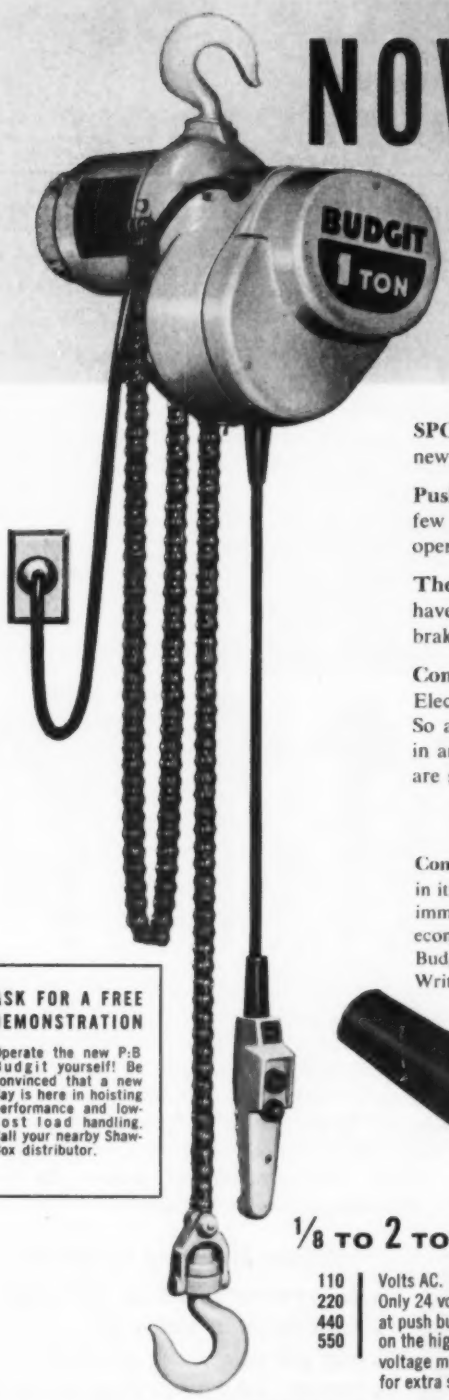
SHERRITT GORDON MINES LIMITED

Circle 602 on Page 53

NOW P:B BUDGIT®

ELECTRIC HOIST

"FRACTURES FRACTIONS"



SPOTTING speed and accuracy are "right on the button" with this new Push Button Budgit Electric Hoist.

Push button action is so sensitive you can spot loads precisely in a few ticks of time. The control station fits the palm for one-hand operation, leaving the other hand free to guide the load.

The P:B Budgit has two automatic brakes. Heavy-capacity cranes have the same type of load brake. It's the only hoist with mechanical brake built into the motor. Each brake alone can hold the load.

Compartmented components add still more value to the P:B Budgit Electric Hoist. All electricals are enclosed, safe from dirt and moisture. So are the motor and motor brake. Gearing and load brake operate in an oil bath, sealed against airborne substances. Maintenance needs are simple as can be.

SEE BULLETIN FOR DETAILS

Compare the new P:B Budgit Hoist with any other electric in its class. It's a portable hoist you hang up, plug in, and use immediately with top efficiency, safety, convenience, and economy. Get full details, plus data on pull cord operated Budgit Hoists in AC, DC, and 12-volt battery powered models. Write for Bulletin 15010-15C today.

ASK FOR A FREE DEMONSTRATION

Operate the new P:B Budgit yourself! Be convinced that a new day is here in hoisting performance and low-cost load handling. Call your nearby Shaw-Box distributor.

⅛ TO 2 TONS

110 | Volts AC.
220 | Only 24 volts
440 | at push buttons
550 | on the higher voltage models for extra safety.

AUTHORIZED SERVICE STATIONS from coast to coast save time, trouble, and money for every Budgit user.

60 A-1

MAXWELL MANNING & MOORE INC. M&M TRADE MARK

BUDGIT ELECTRIC HOISTS

A Product of

MANNING, MAXWELL & MOORE, INC.

Shaw-Box Crane & Hoist Division • Muskegon, Michigan
In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario

Circle 603 on Page 53

YOU'LL DO A BETTER JOB

with **H. V. ADAMS DESIGNED**

HIGH EFFICIENCY FOUNDRY TOOLS

"UNIVERSAL FREE WHEELING"

FOUNDRY SAND RIDDLE

with the Double Eight Vibration

Because of its convenient size, light weight and good riddling capacity it long has been a favorite in the foundry. It also can be used for mixing core sand or for sifting sand directly into molds.

The mechanism is entirely enclosed protecting it from harmful dust and grit.

The main frame is cast in very strong tough aluminum.

It uses quick change ferruled sieves with 20 in. diameter sifting area. There are no loose wires to harm hands.

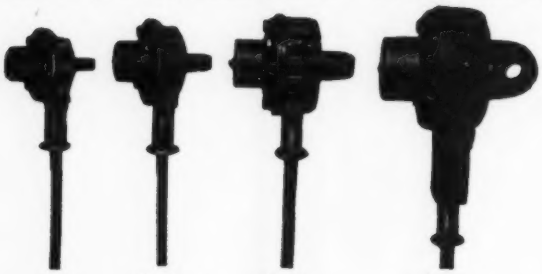
THE "ROTOPLANE" SPEED SIFTER

WILL GIVE YOU

• SPEED • ECONOMY • SAFETY • LONGER LIFE
• GREATER SIFTING CAPACITY

Its sturdy one-piece frame and long shaft add to vibration effectiveness. The sealed-in mechanism assures protection of motor and bearings from exposure to dust and grit. This sealed in protection and "Rotoplane's" free-rotary action vastly increase bearing life. No exposed moving parts endanger the operator. Sieves have 20 inches diameter clear sifting area—are mounted in a smooth steel ferrule with no jagged edges to cause dangerous cuts and scratches.

"RED (Devil) ELECTRIC" VIBRATORS



No 1 No. 2 No. 5 No. 9

These hard hitting Adams designed Vibrators have served the foundries for over 30 years. They are provided with a 6 foot 3 wire authorized cable and 3 wire grounded connector which, when connected with our 3 wire grounded Red Electric Knee Switch, automatically grounds the vibrator protecting the worker from shock. The vibrators have passed the U. S. Government code inspection.

Other Foundry Products:

- No. 11 NOISELESS TYPE VIBRATOR
- A-20 ELECTRIC VIBRATOR
- RED ELECTRIC KNEE SWITCHES
- "ROTO" ADJUSTABLE BIN VIBRATOR
- 2 MIN. UNIVERSAL FINENESS TEST SIFTER.
- UNIVERSAL TRIPOD CARRIER

ORDER ALL SIFTERS AND VIBRATORS WITH GROUND WIRE!!

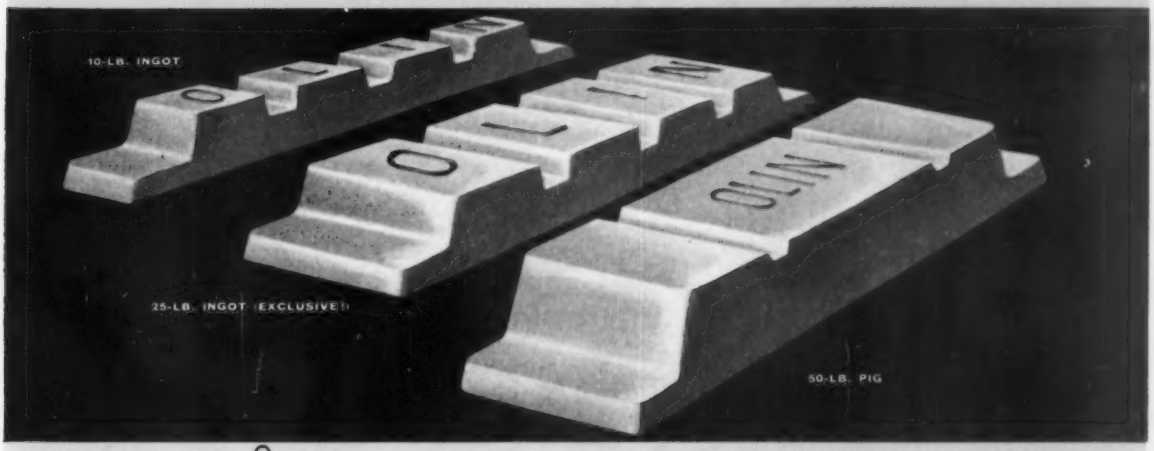
FOUNDRY SUPPLIES MANUFACTURING CO., NOT INC.

2221 Orchard Street - Chicago 14, Illinois

Established 1918 Cable Address: "Rotoplane Chicago" H. V. ADAMS, Mgr.

Circle 604 on Page 53

HOW OLIN ALUMINUM HELPS YOU BREAK INTO NEW CASTING MARKETS



MORE EFFICIENT FORMS. Olin pig and ingot come in standard alloys, in 10, 25 and 50 lb. sizes. The 10 and 25 pounders feature smaller size to increase handling efficiency and speed melting, deep notches for easier breaking, 4-section design for faster crucible charging.

KNOWN CHEMICAL PROPERTIES. Every melt of Olin Aluminum undergoes exacting metallurgical and foundry controls. For example, using quantometric analysis, skilled metallurgists analyze samples of Olin Aluminum for all critical elements . . . and record the results electronically.

PREDICTABLE MECHANICAL PROPERTIES. Batteries of testing devices like this tensile machine are used to check testing bars of Olin Aluminum for tensile, shear, compressive and twisting strength.

You create a new market every time you persuade a prospect that aluminum castings will improve his end product.

Olin Aluminum can help you prove that point in the first place . . . and can help you keep your customer "sold" thereafter. That's because we provide you with:

- **Primary metal—made to the most critical "specs" for your most demanding jobs.**
- **Prompt, thoroughly qualified technical assistance.**
- **Ready access to Research and Development.**

Join those firms that are expanding their operations by finding new and better applications for aluminum castings. Make Olin Aluminum your source of superior casting alloys *—and* of metallurgical know-how.

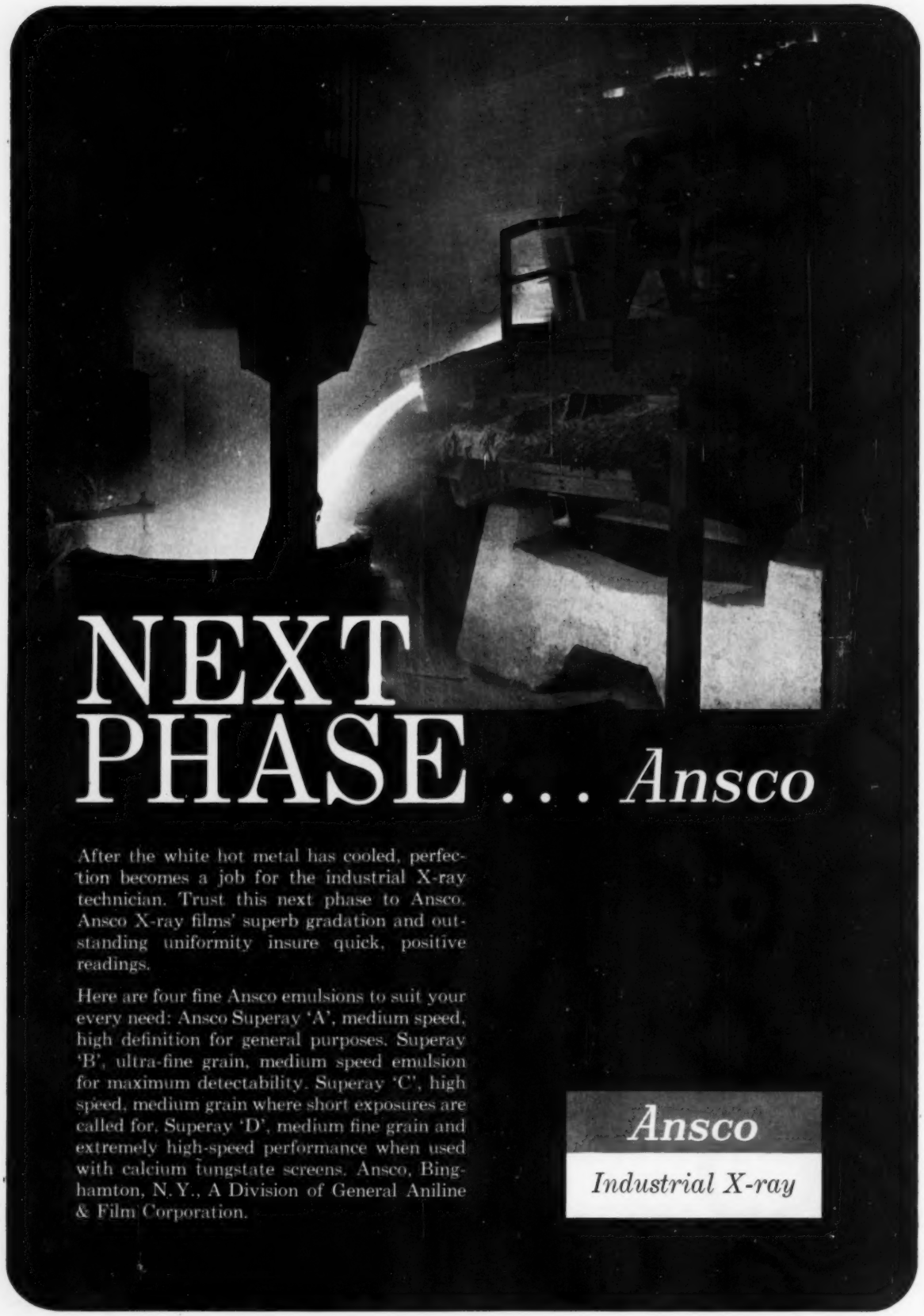
See us at the Philadelphia Castings Congress
Booths 1022-24 May 9-13

Member of American Foundrymen's Society

OLIN ALUMINUM®

OLIN MATHIESON • METALS DIVISION • 400 PARK AVENUE • NEW YORK 22, N. Y.

Circle 605 on Page 53



NEXT PHASE . . . *Ansco*

After the white hot metal has cooled, perfection becomes a job for the industrial X-ray technician. Trust this next phase to Ansco. Ansco X-ray films' superb gradation and outstanding uniformity insure quick, positive readings.

Here are four fine Ansco emulsions to suit your every need: Ansco Superay 'A', medium speed, high definition for general purposes. Superay 'B', ultra-fine grain, medium speed emulsion for maximum detectability. Superay 'C', high speed, medium grain where short exposures are called for. Superay 'D', medium fine grain and extremely high-speed performance when used with calcium tungstate screens. Ansco, Binghamton, N.Y., A Division of General Aniline & Film Corporation.

Ansco

Industrial X-ray

Circle 606 on Page 53

Circle 607 on Page 53→

Clark parts being loaded for air shipment . . . five minutes from the Clark Central Parts Depot.

Make sure of the service . . . before you buy!

Costs start climbing the minute a fork truck goes out of service. The national average for truck downtime is conservatively estimated to be $16.48 per hour. An important reason why fast, qualified parts service is essential.

It's why Clark dealers offer you the largest inventory of parts in the industry. It's why Clark maintains a 16,000 mile private wire communication system. It's why Clark has built a multi-million dollar parts warehouse near Chicago's Midway Airport.

Everything in the Clark service system is geared to speed. Vital materials handling equipment must be back on the job *fast!* To assure you of fast service Clark provides you with over 117 service facilities throughout the nation . . . each carrying a complete parts inventory. To back this up, the Clark Central Parts Depot maintains an inventory of over 5 million parts . . . emergency parts that can be air-shipped to any part of the country in a matter of hours. *Only* Clark offers you this service.

Want to see how it's done? A colorful brochure and a film strip describing this service system are available through your local Clark dealer. You'll find him listed in the yellow pages under "Trucks, Industrial." Or, if you prefer, write direct to: Clark Parts Service, Clark Equipment Company, Battle Creek, Michigan.

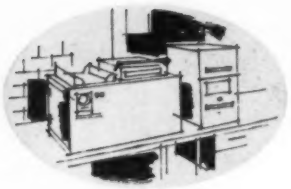
CLARK® EQUIPMENT

For full details, circle 77 on reader service card

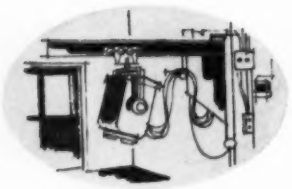
Printed in U. S. A.

Nine different ways...

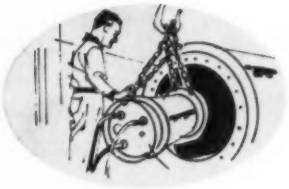
TVX
remote-inspection unit



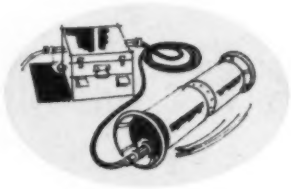
Xeroradiographic unit for
dry-process radiography



OX-250 general
utility x-ray unit

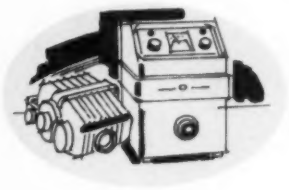


Resotron 300*—
300-kvp portable x-ray

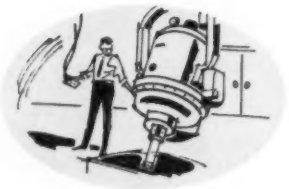


OX-175 — 175-kvp
portable x-ray

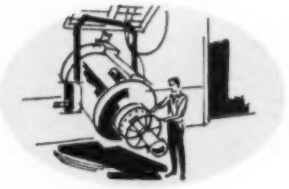
LX-140 — ultra-compact
portable x-ray



LC-90 lightweight
mobile x-ray



Resotron 1000*—
million-volt x-ray



Resotron 2000*—
2-million volt x-ray

to look at your products!

Let General Electric X-Ray lend a hand

G-E x-ray inspection equipment covers every need — with units available in power ranges from 5 to 2,000-kvp output . . . choice of wet or dry radiographic processing . . . even *remote-television* x-ray fluoroscopy. Production-line, continuous inspection can easily be arranged where desired.

There's no need at all to settle for piecemeal help when you want x-ray apparatus, supplies or installation-planning assistance. Instead, take advantage of the industrial x-ray experience General Electric has gained through half a century of serving needs and solving problems much like your own. You stand to come out ahead in many ways. Our specialists have the knowledge that can find right answers in a hurry. Our research facilities are set up to solve even the most unusual puzzles.

For assistance with your inspection problems, contact our office in your area, or just write X-Ray Department, General Electric Company, Milwaukee 1, Wisconsin, Room YY-34.

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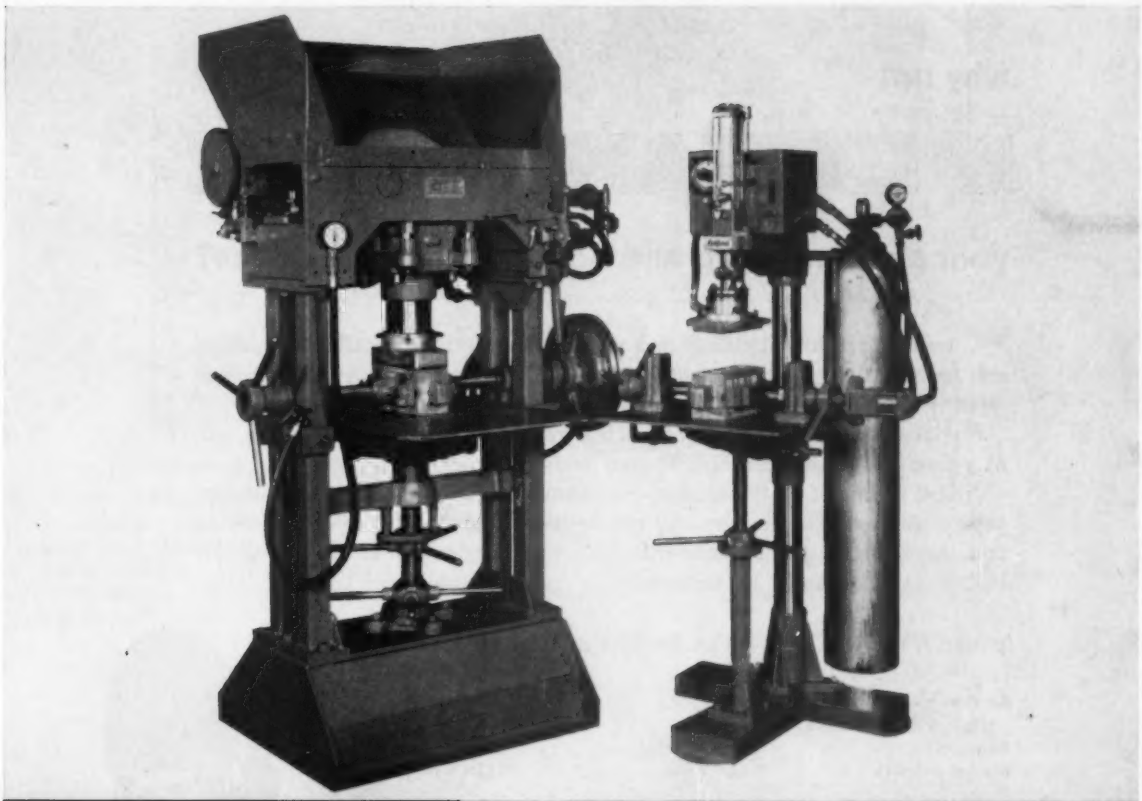
GENERAL ELECTRIC

Circle 608 on Page 53



Redford

NO. 4 CORE BLOWER with MODEL H-1-E CO_2 CORE HARDENING STATION

The right tools to get maximum performance with a minimum of effort if you make cores by the CO_2 Process.

One core box is being blown while another one is automatically clamped, the cores hardened in the core box and the core box released ready to remove finished cores.

The table height of the Model H-1-E Core Hardening Station can be adjusted to correspond with the height of the core blower table. Gassing time is quickly changed to meet job requirements.

Whether you blow cores with conventional sand mixtures or use the new CO_2 Process, REDFORD EQUIPMENT gives you the best in over-all performance.

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BULLETINS 4 and H

Circle 609 on Page 53

why not

MECHANI-MIZE®

your sand handling and conditioning operations?

MEANING: Now it's easy and more economical for small and medium size foundries to get their sand up off the floor . . . without a major investment in equipment and without extensive revision to plant layout.

National's Mechani-Mize program lets you mechanize *progressively*—a unit at a time—at a pace that will fit your budget.

A few, of many, National sand conditioning, handling, screening and conveying units are shown here. *All* are designed and built to meet National's traditionally high quality standards. All are foundry *proven* units . . . ruggedly built to *work* efficiently in the foundry . . . to *save* foundrymen time and labor.

WRITE NATIONAL FOR DATA SHEETS on these Mechani-Mize units:

Air Conveying (High & Low Pressure)	Coolevayor	Dust Collection
Aerators	Elevayor	Shell-Mull
Bucket Loaders	Screen Master	Utility Unit
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NATIONAL ENGINEERING COMPANY

646 Machinery Hall Bldg., Chicago 5, Illinois

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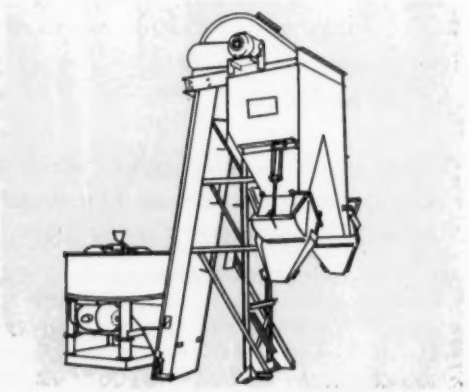
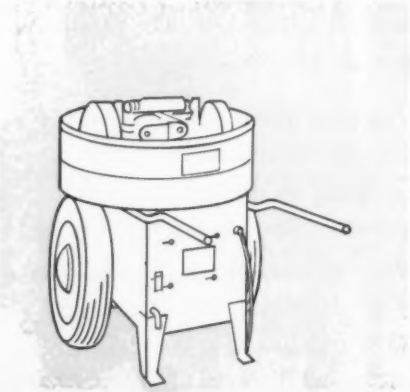


MOLDING

Mechani-Mize with MOLDER'S HELPER®

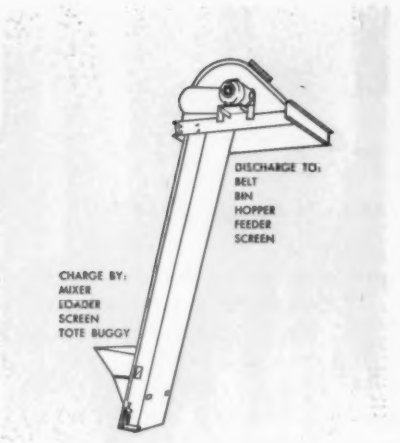
Cuts molder's time by 50%. Eliminates sand transfer from mixer to molder's hopper. Elevates and aerates full charge to molding station within seconds. Many arrangements possible.



MULLING

Mechani-Mize with PORTO-MULLER®

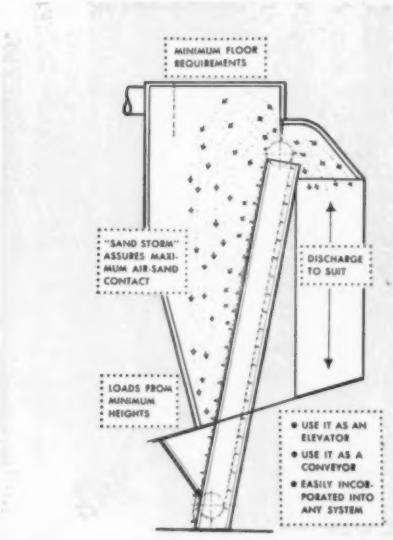
Mix *any* sand *any*where in the shop. 100% portable. No hoists required. You just plug it in and start mulling. Also available with stationary base.



DISTRIBUTING

Mechani-Mize with ELEVAYOR®

Fast *elevator-aerator-conveyor* carries off full batch from mixer within 20-30 seconds. Or, use with front end loader; as elevator to distributing belt or storage bins. Can be designed to fit job at hand.

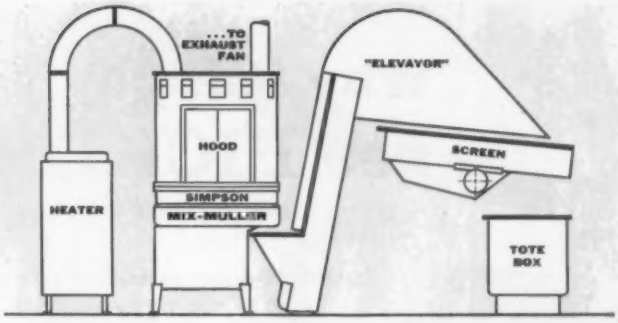

MINIMUM FLOOR REQUIREMENTS
"SAND STORM" ASSURES MAXIMUM AIR-SAND CONTACT
DISCHARGE TO SUIT
LOADS FROM MINIMUM HEIGHTS
• USE IT AS AN ELEVATOR
• USE IT AS A CONVEYOR
• EASILY INCORPORATED INTO ANY SYSTEM

COOLING

Mechani-Mize with COOLEVAYOR

A practical, low cost *answer* to hot sand problems. Fast, efficient, compact; cools, aerates and elevates at same time. Design permits maximum air-sand contact time.

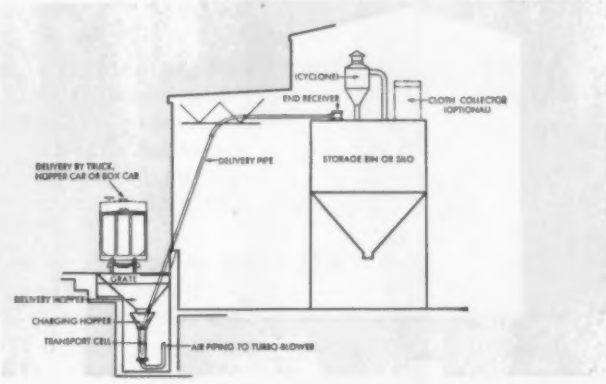
F360



SHELL MOLDING

Mechani-Mize with SHELL-MULL®

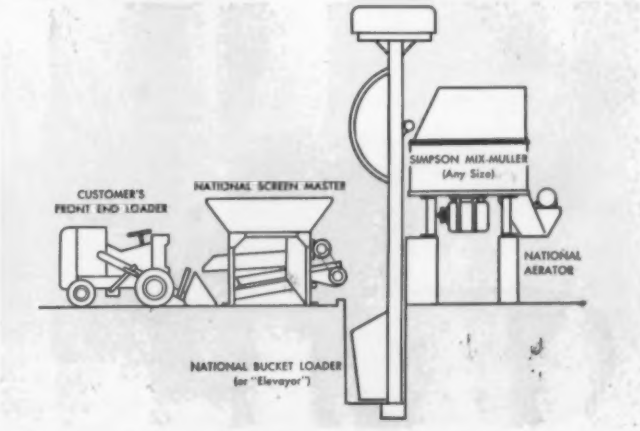
"Packaged" unit provides full control over coating operations at low initial cost. Available for use with *any* size Mix-Muller . . . or continuous Multi-Mull mixer.



CONVEYING

Mechani-Mize with LP AIR-CONVEYOR

Low cost, low pressure pneumatic transporter slashes maintenance costs—fully automates dry sand delivery. Drawing shows arrangement which reduced sand delivery costs $12,000 in one year. Many uses in the foundry.



SAND CONDITIONING

Mechani-Mize progressively with NATIONAL UTILITY UNIT

Here's an *entire* sand conditioning unit which can be assembled a unit at a time! If you have a Mix-Muller, you have a start! Includes receiving hopper, screening, magnetic separator, Bucket Loader, dust hood, mixer (any size) and aerator. Many arrangements possible.

Circle 610 on Page 53

why it'll pay you to see PICKER *first*

about radiographic inspection problems

*e.g.

1 here you get **exactly the right machine**—x-ray or isotope—to handle your problem best (x-ray is better for some jobs, isotopes for others). Nowhere else can you find anything even approaching the range of radiographic equipment Picker offers *(see index below for some idea)*

1 here you get **topflight local service** - the dependable facilities of the nationwide Picker X-Ray service network. Right in your own backyard there's probably a local Picker office with service engineers constantly on the job to keep your equipment running at peak form.

1 here you get **expert counsel** on *anything* and *everything* having to do with radiography or fluoroscopy. We'll test radiograph your own product and come up with recommendations. Advise you on exposure technics: plan and supervise shielded installations—go the whole way *with* you, *for* you. We even offer a training course on Basics of Radiography: it comes free with the purchase of Picker equipment.

1 all this at your command by simply calling your local Picker office (see 'phone book) or writing Picker X-Ray Corporation, 25 South Broadway, White Plains, New York.

*e.g *for in-the-field radiography of steel up to 2" thick (e.g., pipeline work)*

here's a case in point

TECH/OPS 489 10 curie Ir ''' (5.5 RHM output)
Practical for steel up to 2" thick.
Will radiograph full girth weld of inch-thick 8" diameter steel pipe in four minutes.
Travels snug-packed in sturdy fiberglass case.
Weighs only 58 lbs. complete, ready-to-go.
Price $1375 complete (without source).
Picker x-ray
INSPECTION CABINETS
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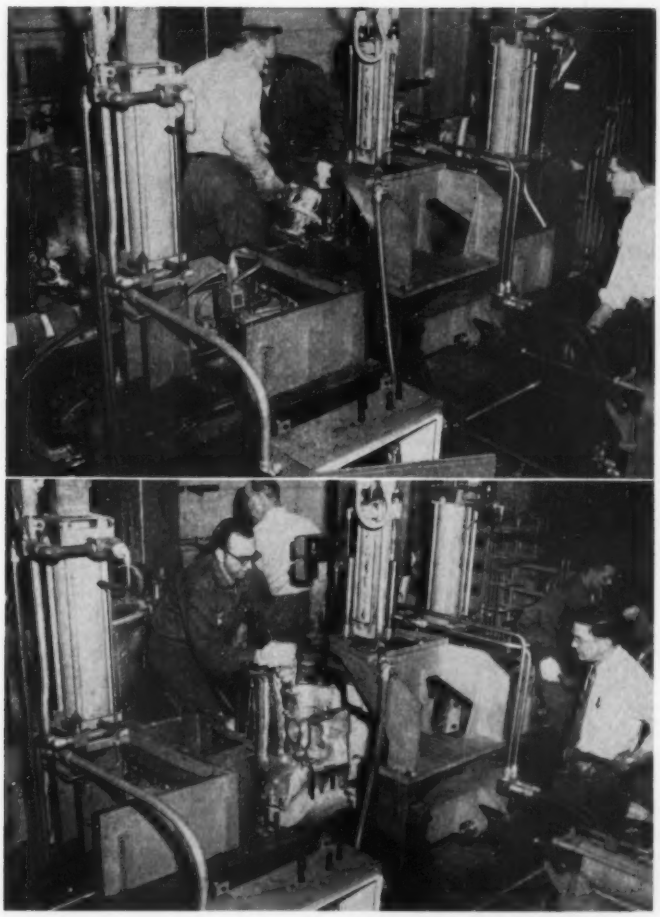
PICKER "HOTSHOT" 90 KV, 110 KV
PICKER MOBILE X-RAY UNITS 150 KV, 270 KV
PICKER X-RAY UNITS 25 KV Beryllium Window
PICKER "CYCLOPS" 1250 curies, Cobalt
PICKER "PIPELINER" 50 curies, Iridium
TECH/OPS COBALT UNITS 5, 10, 50, and 100 curies
TECH/OPS THULIUM UNITS 50 curies

no capital investment if you'd rather rent ● ask about the PICKER RENTAL PLAN



Top illustration shows two men pouring aluminum into a permanent mold of a transmission case. Bottom picture shows the finished casting being ejected after the molds have opened

The Permanent Mold Die Company has long earned the respect and confidence of automotive manufacturers. For years they have specialized in the production of permanent molds and cores, and die cast dies. Qualified engineering and foundry personnel can tackle and solve any permanent mold problem you care to throw at them. Best of all, company prices are well within reason. Delivery, of course, is always on time.

PERMANENT MOLD DIE COMPANY, INC.

2275 NINE MILE RD., HAZEL PARK, MICHIGAN

SELF CONTAINED AUTOMATICALLY CYCLED PERMANENT MOLD MACHINE PRODUCES 23 LB ALUMINUM CASTINGS

Because of the ever increasing size of aluminum castings used in the automotive industry, the PERMANENT MOLD DIE CO. devoted a lot of time and effort toward the development of automatically cycled permanent mold machines for the production of large automotive aluminum castings. The one pictured here is of minimum weight. Machine can accommodate larger castings. This automatically cycled machine is the perfect answer to all those questions. Check these points:—Fully automatically cycled and self lubricated—Variable timing—Nonflammable hydraulic system, water cooled—Automatic casting ejection. These machines have been developed and proved only recently, but the profits they have made for users are already in the records. If you are interested in the economical production of large aluminum castings on a given number per day basis, you might want to ask us about our machines.

Circle 612 on Page 53

With new RIS-A-SLEEVS by Johns-Manville . . .

riser metal stays molten . . . precious minutes longer!

Now—for aluminum, brass and bronze casting—a new riser sleeve that contains heat more effectively than any product of its kind!

Here's the kind of riser sleeve you've long hoped would come along!

Developed by Johns-Manville research scientists, RIS-A-SLEEV reduces heat transfer as effectively as an advanced industrial insulation. With heat more effectively contained within the sleeve, you have precious minutes longer to feed small remote areas, and greater assurance that the riser metal will be very last to freeze.

Because RIS-A-SLEEV insulates better, it lets you cut down still further on riser sizes . . . gives you closer control of solidification . . . results in sounder castings and fewer rejects.

And, of course, RIS-A-SLEEV will not contaminate sand. It's ideal, too, for blind risers. Available in complete range of sizes . . . at surprisingly little cost. We invite you to test RIS-A-SLEEV. We'll be pleased to send you samples along with complete information. Write today to Johns-Manville, Box 14, New York 16, New York.

JOHNS-MANVILLE

JOHNS-MANVILLE JM PRODUCTS

Circle 613 on Page 53

The sand in the microphoto above speaks quality. It's pure and fine, with the excellent rounded grain properties so desired for foundry use. This is indeed a superb sand—finest for foundries.

The obvious merits of quality can be yours with Wedron Silica

Send for illustrated brochure on Wedron sands.

Circle 614 on Page 53

all muscle

...where it counts most

Sterling EXTRA HEAVY DUTY Foundry Flasks

OTHER HIGHLIGHTS OF THIS DESIGN

- Individually Engineered
- Flanges and Reinforcing Members Automatically Welded to Channel Walls
- Precision-Machined Surfaces
- Heavier Walls — Heavier Solid Reinforcing
- All Fittings Jig Welded
- Accurately-Installed Pins and Bushings

Beefier flange construction — broader mating surfaces, more refinishing stock — for every thickness of channel web, makes Sterling Extra Heavy Duty flasks outstanding performers on any foundry floor.

One among many Sterling design superiorities, this feature gives extra assurance of bed-rock dependability throughout a longer production life — particularly where service conditions and customer requirements are severe. Profit-building benefits include: positive match — minimized deformation — higher resistance to ramming shock and machine stress — improved stability under sharply rising heat and pressure of large-metal-volume pourings.

Whatever your flask needs, you find there is no substitute for Sterling's unsurpassed leadership in engineering — uncompromising quality in construction.

AD-4548

Circle 615 on Page 53

STERLING NATIONAL INDUSTRIES, INC.
Founded in 1904 as Sterling Wheelbarrow Co.
Milwaukee 14, Wisconsin, U.S.A.

Associate: STERLING FOUNDRY SPECIALTIES LTD.
LONDON • BEDFORD • JARROW-on-TYNE, ENGLAND

Sterling
WORLD WIDE SERVICE

WHEREVER METALS ARE CAST... FOUNDRY
MARCH 1960

It's Up to You

The foundry industry's promotion of castings is moving into high gear.

Malleable Castings Council reports highly satisfactory results from its 1959 advertising promotion campaign in business publications and now is embarked on the second year of that activity (page 167).

Steel Founders' Society of America has a new promotion booklet, "Sinews of Modern Living" for distribution by its members which deals with the story of steel castings (cover and page 136).

Last year the Gray Iron Founders' Society staged 22 casting clinics in 19 cities for users of cast parts. These clinics were so successful that additional ones are being conducted in 1960.

Investment Casting Institute has a new book, *How To Design and Buy Investment Castings*, and Non-Ferrous Founders' Society is embarking on a marketing-technical-cost program.

Promotion of castings as engineering components has spread to the suppliers of products used by foundries. Several producers of pig iron, individually, have sponsored advertisements in both business and consumer magazines which tell of the virtues of ferrous castings for a wide variety of uses. Other programs of this nature are being considered.

The growing importance of aluminum castings and the potentials of cast aluminum parts to the automobile industry have been hammered home to the general public as well as to the designer in extensive promotion campaigns. The number of individual foundries carrying on their own castings promotion programs appears to be growing.

What will be the result of this upsurge in castings promotion? If the malleable industry will follow up with engineering calls the tremendous volume of inquiries from the advertising program; if gray iron foundrymen will continue to provide customers who attended design clinics with additional information and knowhow in the use of castings; if steel foundrymen will see that the new SFSA promotional booklet is given thorough distribution; and if the other organizations pushing promotion of castings will gain complete support of their members, the demand for engineered castings in both the ferrous and nonferrous fields should swing upward. Because castings provide superior products for a wide variety of engineering applications, converting components produced by other methods of fabrication to cast metals should be accelerated.

Foundries belonging to these various trade associations, in which the promotion of castings is a major program function, have a golden opportunity. Whether or not castings sales increase depends on how well each foundry organization picks up the ball and runs with it.

Frank G. Steinebach

Editor

Pouring Castings in Ungassed Sodium Silicate - Bonded Molds

Use of ungassed sodium silicate-bonded facing sand brought new business into this foundry. The technique was developed to meet demands for improved casting finish without use of varied sand mixes

● ALTHOUGH the CO_2 process has been used for cores, stack molding, and facings at C. Lee Cook Co., Louisville, for a long time, the company has developed a new application of the method to meet demands for improved casting finish. This new method produces bronze, babbitt, and gray iron castings with a finish of 125 microinches rms. It requires no additional equipment and a minimum of sand control.

Cook's prime jobs are bushing-type castings for industrial piston rings and metallic packing rings and cases. These castings range in weight from a few ounces to 1500 lb, and casting finish is not particularly important.

In the ferrous and nonferrous foundries, each has a basic sand for the general run of castings. Practically all castings are machined 100 per cent, but the few which do not receive complete machining require a better as-cast finish than can be obtained with the sand mix employed to make bushing-type castings. Space limitations ruled out additional sand mixes and mixing equipment, but rough finish on unmachined castings had to be eliminated to avoid unreasonable grinding labor.

In addition, jobbing work of various shapes and weights, Fig. 1, recently has been brought in, thus increasing the need for an as-cast finish more comparable to finishes available from foundries using varied base sands and mixing equipment.

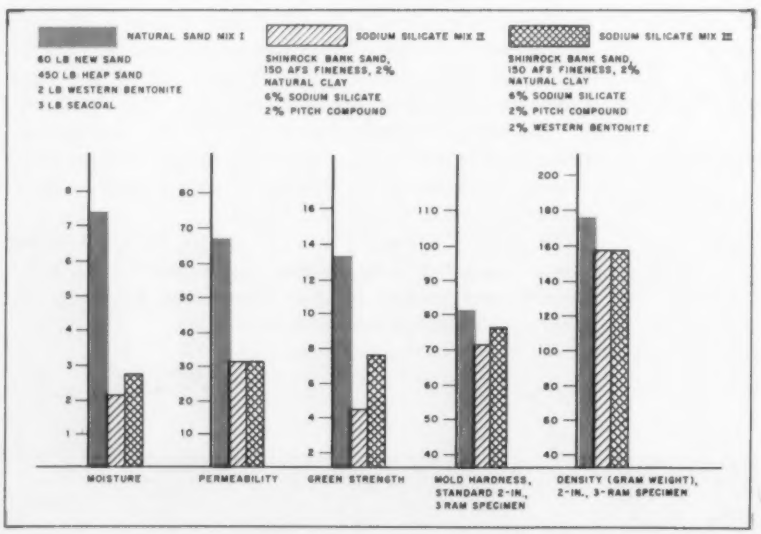
The established method of facing molds with sodium silicate-bonded sand and gassing them showed great improvements over regular green sand molding. This method had limited application, however, because it required either special rigging of patterns for gassing or a break in production for the lance and cup method of gassing molds.

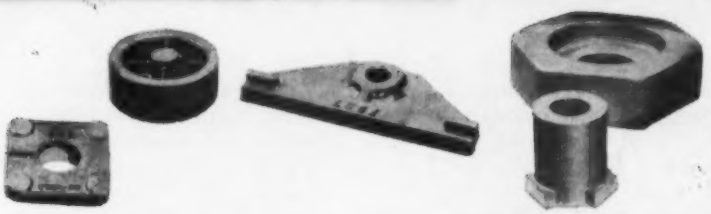
Uncured Molds Are Poured— The newly developed method mentioned previously differs from other sodium silicate-bonded sand facings in that molds are poured in the green or uncured state. Thus, the use of CO_2 or any other curing material or gassing device is eliminated.

The key to this method is the fact that sodium silicate-bonded sand mixes can be cured with heat. Working on the theory that the slight skin created by air setting and the advance heat from molten metal entering the mold will cure the sand sufficiently to prevent cutting and washing, Cook experimentally poured sodium silicate-faced green or uncured molds.

It also has been established that the CO_2 process permits the use of

Fig. 2—Chart compares properties of a natural sand mix and two sodium silicate mixes, one with western bentonite and one without bentonite


NATURAL SAND MIX I
60 LB NEW SAND
450 LB HEAP SAND
2 LB WESTERN BENTONITE
3 LB SEACOAL
SODIUM SILICATE MIX II
SHINROCK BANK SAND, 150 AFS FINENESS, 2% NATURAL CLAY
6% SODIUM SILICATE
2% PITCH COMPOUND
SODIUM SILICATE MIX III
SHINROCK BANK SAND, 150 AFS FINENESS, 2% NATURAL CLAY
6% SODIUM SILICATE
2% PITCH COMPOUND
2% WESTERN BENTONITE
MOISTURE
PERMEABILITY
GREEN STRENGTH
MOLD HARDNESS, STANDARD 2-IN., 3 RAM SPECIMEN
DENSITY (GRAM WEIGHT), 2-IN., 3-RAM SPECIMEN



By W. G. PROBST III and GERALD R. SCOTT

Foundry Superintendent
C. Lee Cook Co., Louisville, Ky.

Sales Engineer
Delhi Sand Co., Cincinnati

Fig. 1—Jobbing work of these various shapes and weights created need for better as-cast finishes

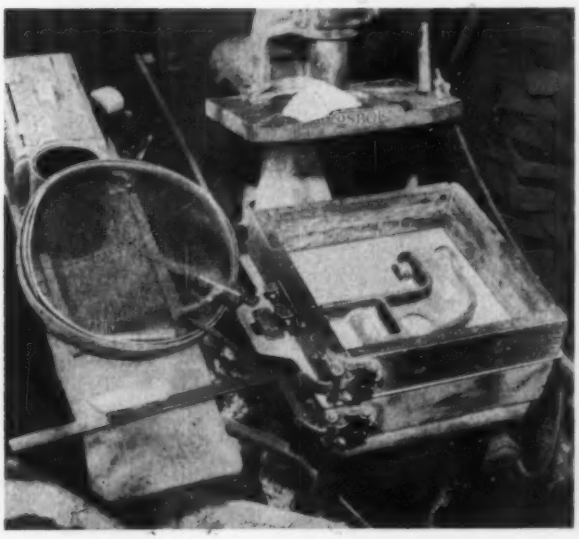
finer sand. Therefore, a 150 AFS fineness Shinrock bank sand with a low clay content was tried in conjunction with the heat-setting sodium silicate concept. This bank sand was chosen not only because of its fineness, but also because the clay aided green strength. The silicate used is of the high collapsible grade which gives a fast enough reaction rate that no catalyst is necessary.

Experiments started with castings in the drag half of the mold (permitting low green strength sand mixes) and immediately proved successful in all major respects.

An old fashioned paddle mixer has proved satisfactory for sand preparation because only a small amount of sand is necessary to face a mold to an average depth of 1½ in. Mixing procedure is as follows: Measure dry bank sand into the mixer, add sodium silicate, and mix for 2½ minutes. Then add pitch compound and mix for ½ minute more. If western bentonite is used, as in Mix III in Fig. 2, add the bentonite after the pitch compound and mix ½ minute longer. When bentonite is used, it is the last addition made, regardless of the other additives.

Facing sand is riddled (Fig. 3 and 4) on the pattern to provide even distribution, and the mold is completed with heap sand, Fig. 5. After the regular cycle of jolting and squeezing, the pattern is drawn from the uncured mold, Fig. 6, and closed immediately. Molds then are poured in this green or uncured state. This procedure results in castings with an average finish of 120 microinches rms, Fig. 7, 8, and 9, compared with 550 to 625 microinches rms on the same castings

Fig. 3 and 4—Sodium silicate-bonded facing sand is riddled on pattern for even distribution. Illustrations show flasks before riddling, left, and after, right



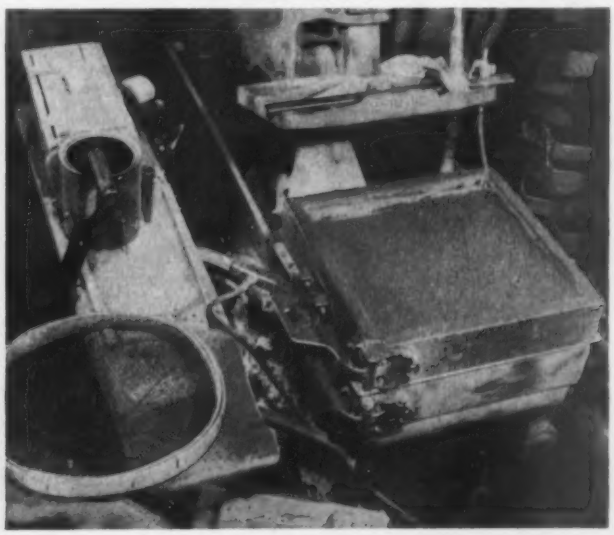


TABLE I—As-Cast Finishes with Various Casting Processes

Casting Process	Finish Microinches Rms
Green Sand Casting	250-1000
Special Sand Cast Processes	250 and Down
Diecasting	40-100
Investment Casting	30-100
Plaster Molds	30

with 60 AFS fineness natural-bonded molding sand.

What Microfinish Is—Microfinish is an unfamiliar term to the average foundryman because it normally is applied to machined surfaces. The microfinish or surface smoothness of various casting processes varies from 30 to 1000 microinches rms. The equipment used to measure surface smoothness is of recent development and normally is used only in foundries making precision castings. Surface roughness is specified as the average height of finely spaced irregularities.

This height is expressed directly in microinches rms (millionths of an inch) across the surface in a direction to give the largest reading. A perfectly smooth surface thus would give a reading of 0. As roughness increases, microfinish readings increase. Table I shows a comparison of as-cast finishes with various casting processes. The wide variation in finish on green sand castings is due to the variables of sand fineness number, mold hardness, materials in sand, mold pressure, and other factors.

To illustrate the flexibility of the sodium silicate facing mix, test molds were made for a variety of castings weighing from 1 to 412 lb (Fig. 10). Sand mixes used were those shown in Fig. 2. The variables of mold hardness, casting weight, type of molding, and microfinish of the pattern and casting were checked on molds and castings made from both natural-bonded green sand and sodium silicate facings.

Table II shows the results from the test molds. Comparison of weight of castings made in natural sand and in sodium silicate facings shows a reduction of weight by approximately 4 to 5 per cent with sodium silicate-faced molds. Dimensional checks show that this reduction is due to reduced mold wall movement. Unfortunately, not enough information has been gathered to report on the reduction of risers, but indications are that they could be reduced on the basis of improved mold wall stability.

Several mixes are used, depending on casting design and weight as well as on pattern condition and method of molding. However, only one sand, a 150 AFS fineness bank sand, is used in all mixes. The original mix was 150 fineness bank sand, 6 per cent sodium silicate, and ¼ per cent liquid sand conditioner. This mix produced good results for finish and dimensional accuracy, but lacked the green strength necessary for difficult draws and good peel at shakeout.

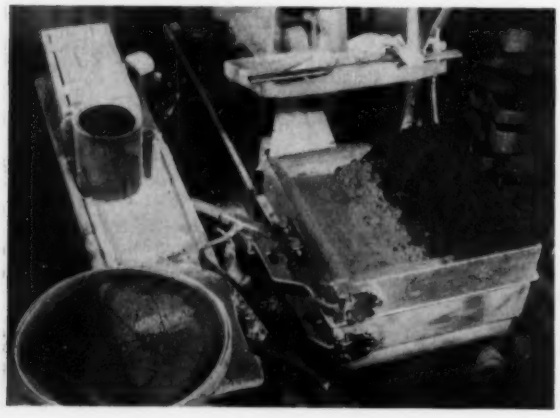
Pitch Aids Peel—Tests therefore were run on western bentonite to determine the most effective bentonite addition and the use of various combustibles for promotion of peel. The percentage of combustible arrived at was based on its effect on green properties and man-hours of cleaning time saved. Casting finishes with and without combustibles were equally good except for pitch, which was effective on peel properties and improved finish

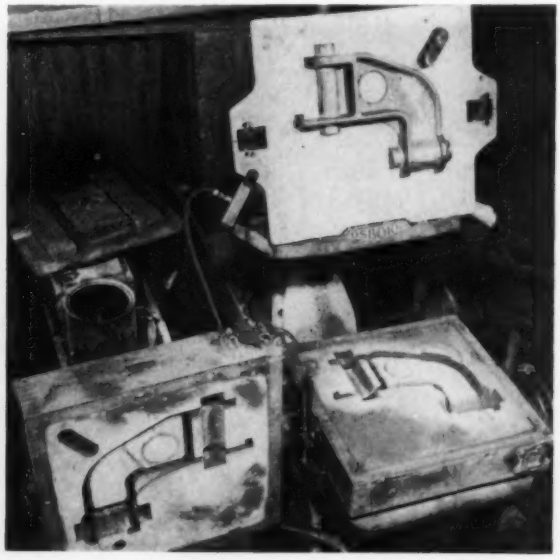
TABLE II—Comparison of Surface Finishes on Test Mold Castings Made with Natural-Bonded and Sodium Silicate Sands

Casting*	Mold Hardness At Parting Line	Casting Weight	Type of Molding	Microfinish	
				Patterns	Castings
A I	75	24 lb. 4 oz.	Jolt Squeezed	45	625
A III	60	23 lb. 4 oz.	Jolt Squeezed	45	110
B I	75	8 lb. 1 oz.	Jolt Squeezed	55	550
B III	65	7 lb. 12 oz.	Jolt Squeezed	55	130
C I	75	5 lbs.	Jolt Squeezed	55	550
C III	65	4 lb. 12 oz.	Jolt Squeezed	55	125
D I	No casting made in natural bonded green sand				
D III	70	412 lbs.	Hand Rammed	Wood Pattern	300
E I	70	43 lb. 4 oz.	Jolt Squeezed	Wood Pattern	600
E III	60	41 lb. 4 oz.	Jolt Squeezed	Wood Pattern	200

*Castings: A—Overarm casting. B—Pulley. C—FD 27 plate. E—Six-stud gland.
Sand Mixes: I—Natural-bonded molding sand mix I, as in Fig. 2. III—Sodium silicate (high green strength) mix III, as in Fig. 2.

Fig. 5 (below)—The mold is completed with heap sand after the riddling process. Fig. 6 (right)—Following the regular cycle of jolting and squeezing, the pattern is drawn from the uncured mold, and mold is closed immediately. Molds are poured in this state





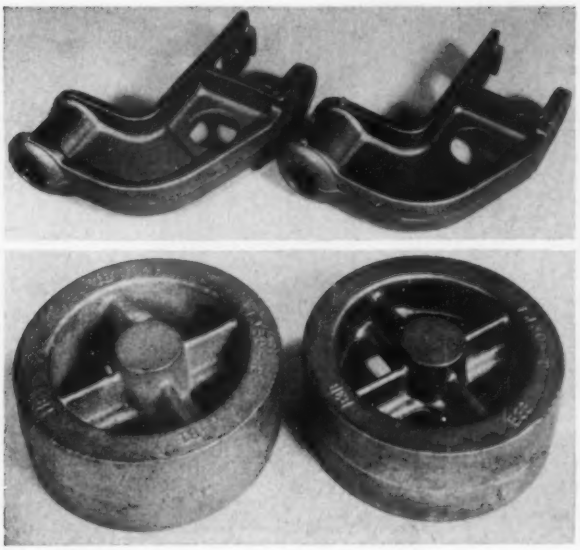


Fig. 7, 8, and 9—Average finish of casting is 120 microinches rms, compared with 550-625 microinches rms on castings made in natural-bonded sand

by about 50 microinches. Two basic mixes resulted; both had approximately 2 per cent pitch compound, and one has approximately 2 per cent western bentonite for increased green strength.

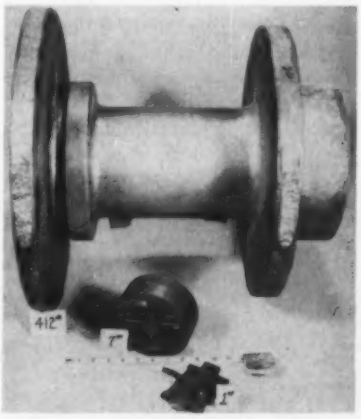
All tests were held to a minimum because it was felt that there was insufficient time to pursue these important but involved experiments in a production foundry laboratory to any greater extent than those reported.

Fig. 2 shows the two sodium silicate mixes and the natural sand base facing mix which is used in regular green sand practice. They are compared on the bases of green compression, moisture, permeability, mold hardness, and density. Moisture was run on a standard Dietert moisture tester. In sodium silicate mixes, the moisture shown is not from water added, but from dehydration of the sodium silicate, which also takes place in the mold when it is poured. Mold hardness was taken on a standard three-ram, 2-in. specimen. Density is shown in gram weight of a standard 2-in. specimen.

These two properties, mold hardness and density, were given to indicate the rammability of the sodium silicate sand. On actual jolt-squeeze operation, mold hardness was 75 to 80 on natural-base molding sand and 65 to 70 on sodium silicate sands. The excellent flowability of sodium silicate sand improves mold detail and density, and time required per mold is decreased due to reduced ramming and less need for touch-up work before closing.

Conclusion — Sodium silicate green sand molding should prove of value to the industry because it enables a foundry, regardless of size, to compete with other processes on the basis of finish and accuracy. In some instances, it has eliminated the need for cores since it held up in places where green sand cores would not. It also has eliminated mold drying and mold washes in heavier work. This area has only been touched on, but shows great promise. The 412-lb casting shown in Fig. 10 was poured green, showed no casting defects, and had an excellent finish because of the 150 fineness sand. Brass and babbitt castings also were very good. They had no defects such as penetration, scabs, buckles, or washes, and no peel problems occurred even without a combustible.

Fig. 10—Castings weighing from 1 to 412 lb were used in the tests to illustrate the flexibility of sodium silicate-bonded green sand



This process requires no extra equipment, personnel, or special skills, and it reduces sand control to a minimum. In effect, Cook Co. has found that where sodium silicate facing is used, sand control is not necessary beyond careful weighing of materials at the mixer.

In summary, this new method of using sodium silicate-treated sand has proved to offer these advantages: 1. Superb casting surface finish. 2. Improved flowability of sand and increased mold uniformity. 3. Improved casting dimensions. 4. More nearly uniform casting weight. 5. Less moisture and gas in mold. 6. More molds per hour. 7. No scabs, buckles, or washes. 8. Reduction of cleaning and grinding by approximately 50 per cent. 9. Less wear on chuck jaws and cutting tools because of close dimension control and good finish. 10. Improved customer relations. 11. Improved yield, with less riser required because of less mold wall movement. 12. Relatively no sand control for type finish obtained.

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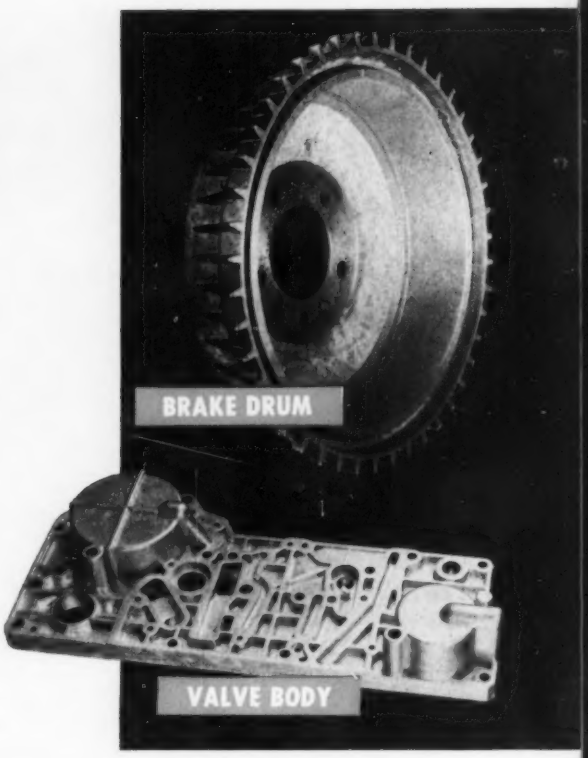
What's Needed To

Expand Use of . . .

ALUMINUM AUTOMOTIVE CASTINGS



Use of aluminum in automobiles has risen from 2 to 57 lb per car since World War II and might go as high as 150 lb or more eventually, if certain problems can be solved

By ROBERT F. THOMSON
Head, Metallurgical Engineering Dept.
Research Laboratories
General Motors Corp., Warren, Mich.

● THE USE of aluminum in automobiles goes back to about the turn of the century. The growth of its use, shown in Table I, has been such that it is estimated the automotive industry eventually will use about 400 million lb of aluminum per year, or about one-tenth of domestic production. This discussion will be limited to the use of aluminum castings, which account for an estimated 85 per cent of all aluminum used in the automotive field.

Primary usage in the past has been in pistons and transmission parts. Potential applications for aluminum castings include cylinder blocks and heads, brake drums, clutch housings, intake manifolds, and others. These parts would increase use of aluminum per car from 57 lb in 1959 to 157 lb. Fig. 1 shows some typical parts.

It Started with Pistons — It is worth-while to take a look at some of the factors which have determined the extent of aluminum usage in the past. Pistons first were converted to aluminum because of the engineering advantage of low reciprocating weight. This benefit more than offsets the disadvantage of differential thermal expansion between piston and cylinder bore. The desire to reduce reciprocating weight became especially keen with the introduction of V-8 engines. Lighter pistons required less counter-weighting, a fact which resulted in lower bearing loads.

The next significant change came about after World War II, when steel began to be in short supply and aluminum became available.

TABLE I—Aluminum per Car (lb)

Prewar	(Est.) 2
1948	(Est.) 7
1955	(Est.) 35
1958	(Est.) 52
1959	(Est.) 57

There was extensive application to transmission parts. The need for minimum cost resulted in the fact that aluminum castings were largely made by either diecasting or permanent molding. Primarily, aluminum has not been used more because of economic competition with other materials.

Since World War II pig iron has increased in price consistently and at a faster rate than aluminum. If the prices of these two commodities continue to come closer, aluminum will become more and more attractive. One counterirritant to the increased price of pig iron has been the relatively cheap price of steel scrap, with no specific long-term trend noticeable in the period cited. So much for the economics.

It has been evident for some time that appreciably greater market penetration would be made if a practical, economical, wear-resistant aluminum alloy were developed.

Fig. 1—Applications for aluminum castings include the parts shown here

This material would open up the possibility of use for cylinder blocks, brakes, and pumps.

High-Silicon Alloys—As described in a previous article. (FOUNDRY, November, 1958, p. 92), the high-silicon alloys offer good wear resistance. Use of such alloys is not new. Table II shows some of the compositions used in the past—almost exclusively for pistons. The coefficient of expansion decreases with increasing silicon as shown in Fig. 2, and this characteristic accounts for the extensive use of these alloys in pistons.

Refinement with Phosphorus —

TABLE II—Aluminum Piston Compositions

Alloy Type	Si	Cu	Mg	Ni
	UNITED STATES			
F-132	9.5	3	1	
D-132	9	3.5	0.8	0.8
A-132	12	0.8	1.2	2.5
	EUROPEAN			
AlSi 12 CuNi	12	1	1	1
AlSi 18 CuNi	18	1	1	1
AlSi 24 CuNi	24	1	1	1

TABLE III—Comparative Mechanical Properties

Alloy	Tensile Strength, psi As-Cast	Tensile Strength, psi T-7	Fatigue Strength, Notch	E. Mod. $\times 10^{-6}$ psi
355	20-25,000	35,000	7-8,000	10.3
19% Silicon	20-26,000	31,000	7-8,000	13.5
Cast iron	30-35,000		12,000	13-16

One of the really significant developments has been the use of phosphorus as a refining agent. The technique is about 30 years old, but the optimum in modification has occurred in the last few years. Fig. 3 shows a 16 per cent silicon alloy in the unrefined condition. Note the large primary silcon crystals. The addition of 0.01 per cent P caused the refinement shown in Fig. 4. Casting method also affects the degree of refinement.

Other Characteristics—As would be expected, the machinability of the high-silicon alloys is inferior to that of some of the more conventional alloys, and higher tool wear results. The high-silicon alloys also are not among the best aluminum casting alloys, and due allowances must be made for this deficiency.

The physical properties of one high-silicon alloy are compared with 355 alloy and cast iron in Table III. On the basis of laboratory bench tests, the high-silicon alloy compares, in corrosion resistance, with some more conventional alloys, as shown in Fig. 5.

Reducing Vehicle Weight—The potential future expansion in the use of aluminum is predicated on a number of factors. These generally reflect back to the relative economics of light metal utilization by the automotive industry.

Opportunities for weight reduc-

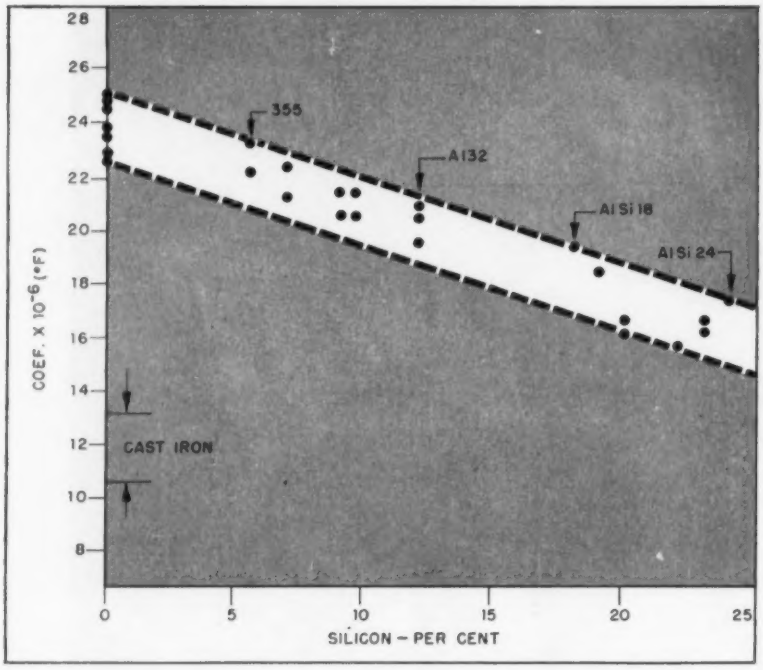


Fig. 2—Effect of silicon on thermal expansion of aluminum casting alloys

tion in vehicles offer one important inducement to extended use of aluminum to improve gasoline economy. The development of more efficient engines after World War II offset increased vehicle weight and the use of automatic transmissions until about 1954. Since that time it has been a losing battle to try to offset these factors by improving engine efficiency.

It would appear that a number of significant developments would further permit decreased vehicle weight through the use of aluminum castings. These include the following: 1. Improved quality of diecastings. 2. Improved physical properties of diecastings. 3. Decreased heat treating cycles. 4. Improved core materials and mold materials for semipermanent mold castings. 5. Improved diecasting die materials. 6. Cheaper methods of producing diecasting dies.

Improved Quality of Diecastings—The use of diecastings has been going through an evolution during the last few years. Some years ago the diecasting process was called on primarily to produce a complicated shape which often was composed of a "lot of holes held together by a little metal." It now also is being asked to produce a casting with good engineering properties, free from internal defects, so that even a machined casting will be pressure-tight without expensive impregnation.

Vacuum diecasting has been investigated by many people in an effort to supply these high-integrity castings, but to date this step alone has not been sufficient, in our experience. There has been some improvement, but still more must be made.

Scrap on some diecastings can run consistently to 15 to 25 per cent and sometimes as high as 100 per cent, especially if the castings must be pressuretight. This situation obviously affects the price of diecastings. Such scrap rates are common enough that some people feel complicated castings can be produced more cheaply by permanent molding, even though the cycle time is appreciably lower. When high scrap is coupled with high capital investment and high die costs, this feeling becomes even stronger.

Improved Mechanical Properties—It also would be highly desirable to improve the mechanical properties of aluminum diecastings, especially in respect to ductility. A 25 per cent or better improvement in modulus of elasticity would have a further significant effect on future applications of aluminum castings.

Decreased Heat Treating Cycle—A typical present-day heat treatment for a semipermanent molded casting consists of a four to twelve-hour solution treatment at 925 to 1000° F followed by a two to eight-hour age at 300 to 500° F to produce optimum properties. It has been pointed out that if one were to make automotive cylinder blocks of such an alloy at a production rate of 10,000 units per day, the heat treating furnaces alone would cover more than two acres. It is obvious this requirement is an added economic penalty. A considerably shorter heat treatment, or none at all, would enhance the possibility of increased future use of aluminum castings.

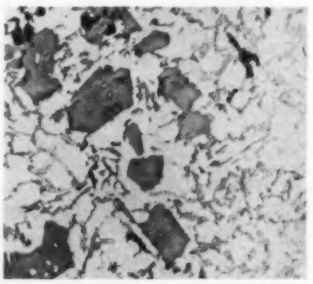


Fig. 3—A 16 per cent silicon alloy in the unrefined state

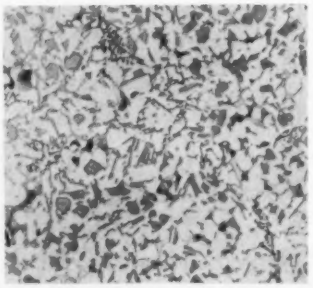


Fig. 4—Addition of 0.01 per cent P caused this refinement

Core and Mold Materials—One of the very attractive properties of aluminum is its excellent conductivity. It is obvious that if one is interested in conducting heat through the wall of a casting to a cooling medium on the opposite surface, much of the thermal advantage is lost if either surface has a significant amount of adhering or trapped core sand. It then becomes extremely important to try to develop a core binder which permits complete removal of all core sand from intricate passages without a subsequent reheating operation. This is especially important if the casting is not to be heat treated or is to be aged only, at 325 to 450° F.

Many binders, such as the conventional core oil used in gray iron founding without appreciable sand removal problems, will not break down completely because of the lower aluminum casting temperature. Core removal thus becomes almost impossible. What is needed is a binder which will disintegrate completely in a few hours when reheated to 300 to 400° F. This temperature is cited because many castings must be stabilized at such temperatures for dimensional reasons.

Diecasting Die Materials—A diecasting die may cost anywhere from a few hundred dollars to more than $100,000. In a relatively short time the die becomes "checked," as shown in Fig. 6. At that time, the die must be reworked or else eventually scrapped. An improvement in life between reworking operations would affect the per-piece price significantly since capital investment in a diecasting machine is high and excessive downtime affects the cost of castings. On some operations, nonproductive time can approach productive time on complicated castings. It has been reported that the use of molybdenum and its alloys shows considerable promise for certain inserts and cores.

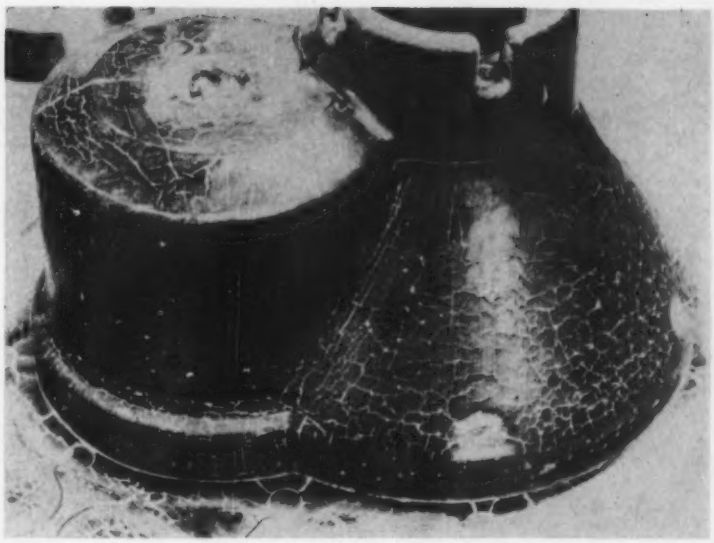


Fig. 6—Expensive diecasting dies become "checked" in a relatively short time. They then must be reworked or even scrapped

Cheaper Dies — Because of the high cost of diecasting dies, there is a very real need for improved and cheaper methods of making die cavities. Especially if more than one die is required, the use of precision cast dies appears very promising.

Editor's Note: This article is from a paper presented at the 12th annual Metals Casting Conference held at Purdue University, Oct. 29-30.

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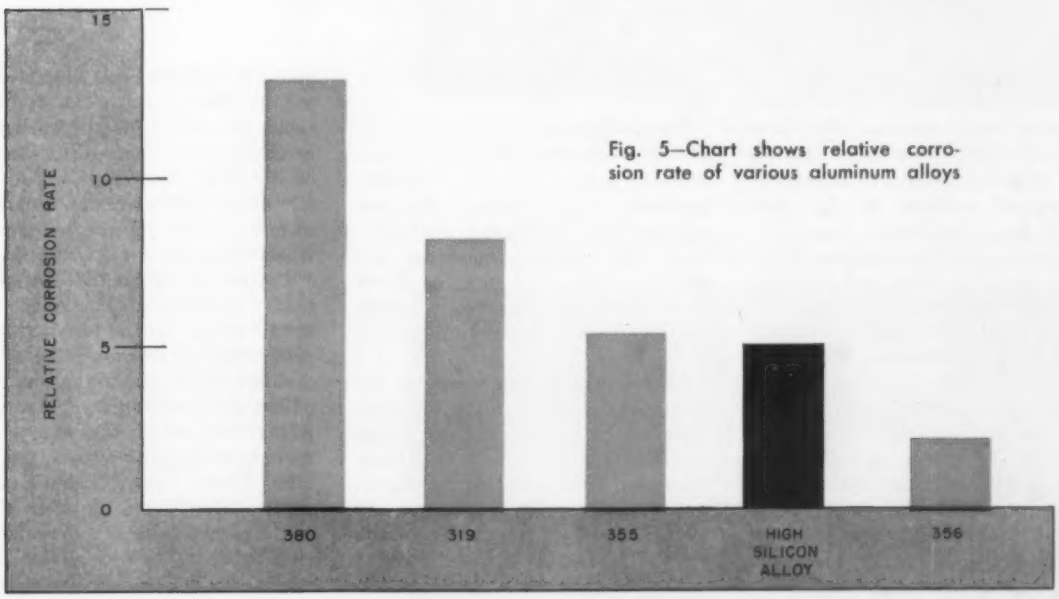
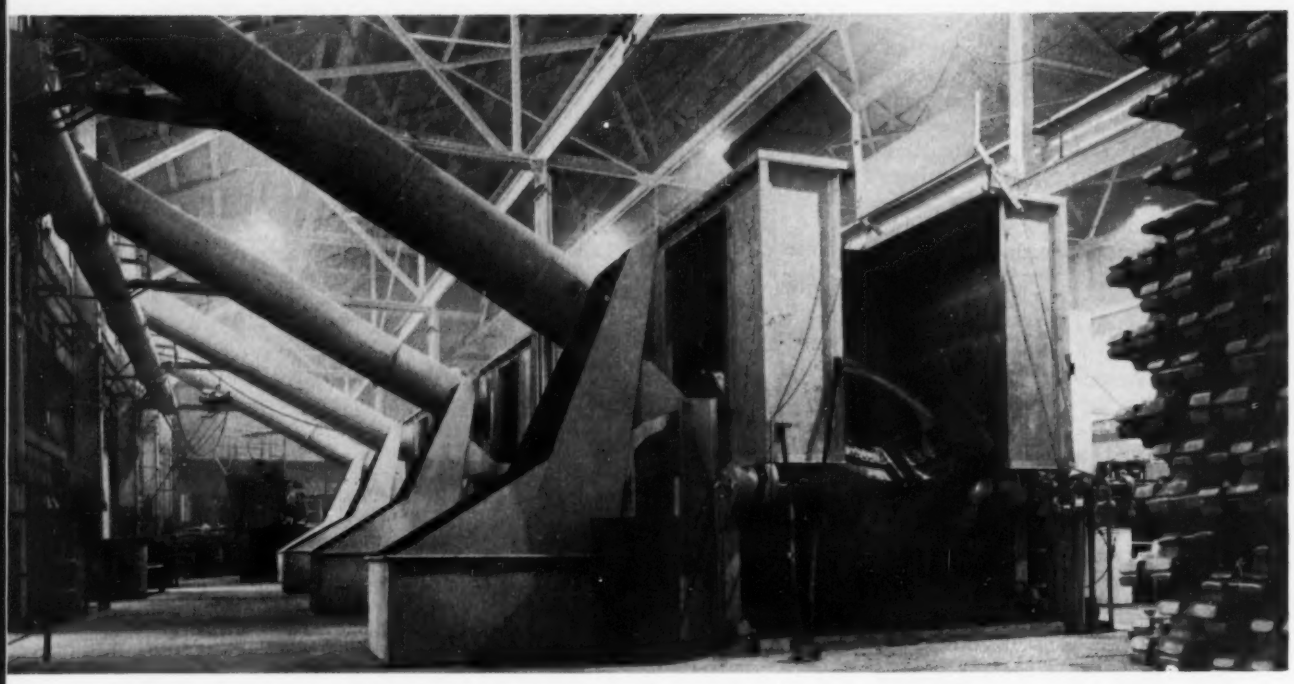


Fig. 5—Chart shows relative corrosion rate of various aluminum alloys



Expanded plant has 4 gas-fired tilting furnaces for melting magnesium. Each unit has a melting and processing rate of 500 lb per hr. Diecasting machines are to the right

Dow Expands Diecasting

● MAGNESIUM and aluminum diecasting operations of Dow Metal Products Co., division of Dow Chemical Co., have been moved from Midland, Mich., to expanded, modernized quarters at the company's Bay City, Mich., plant.

As a result of the transfer, all of Dow's metal casting and fabricating facilities now are consolidated in Bay City. The new diecasting plant occupies about half of a remodeled 84,000-sq-ft building, the remainder of which currently is used for warehousing. As growth requires, the diecasting space can be enlarged easily and quickly into this area. Other Bay City operations include the company's sand and permanent mold foundries, metallurgical laboratory, and fabrication plant, all in adjacent buildings.

Seven diecasting machines are in use—five cold chamber and two hot chamber units. The cold chamber machines include three of 400 tons and one each of 600 and 1000 tons. Both hot chamber machines are 400-ton units and are equipped with automatic metering devices. Castings produced range from 0.1 to 17 lb.

Magnesium melting furnaces include four gas-fired tilting furnaces, each with a melting and processing rate of 500 lb per hour. Aluminum alloys are melted in four reverberatory furnaces. Three of these are 500-lb per hour capacity, and the fourth turns out 1000 lb hourly.

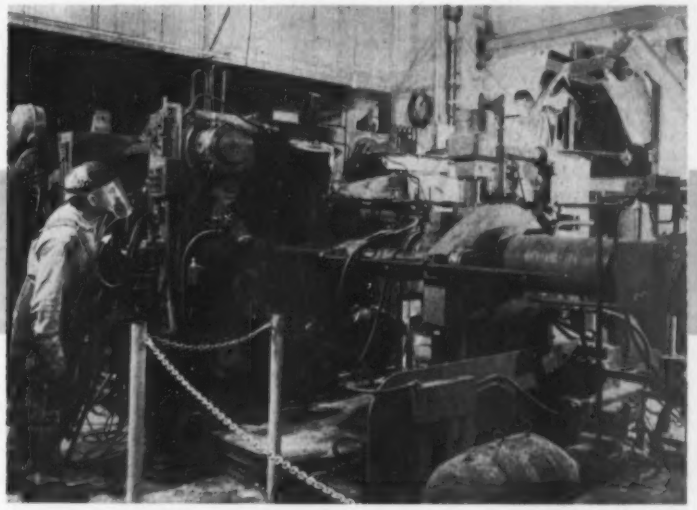
The operation can use alloy ingot and also has facilities for alloying its own metal. To facilitate rapid conversion of the diecasting machines from one metal to the other, the reverberatory furnaces for aluminum and the automatic metering units for magnesium are wheel mounted.

Layout of equipment and functions emphasizes flexibility and speed of operation for maximum production. Conveyors transfer raw castings from the diecasting machines to the trimmers, and the finishing section is adjacent to the melting-casting-trimming area. It offers Dow 1 and 7 chemical treatments. Dow 9 and 17, HAE, painting, barrel finishing, and sand and shot blasting are available elsewhere in the Bay City plant. The

Unit has magnesium holding pot and aluminum reverberatory for fast change from one metal to another

Molten magnesium is poured from furnace into a crucible on a forklift truck for transfer to machines

Facilities



Metal flows into holding pot on 1000-ton cold-chamber machine equipped with device to meter and feed magnesium into shot well automatically

metallurgical laboratory provides regular and frequent analysis of all finishing treatment baths.

Equipment in the metallurgical laboratory includes a direct-reading spectrometer and x-ray machines which are available to the diecasting operation. They supplement checks on dimensional tolerances made hourly on each machine with gages and surface smoothness checks made visually, sometimes under four-power magnification.

The die maintenance shop is considerably enlarged and modernized as a result of the transfer to Bay City. It is equipped with boring mills, lathes, drill presses, and grinders.

Raw castings are placed directly on conveyor by machine operator after their removal from dies. They then are moved quickly to trim presses

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● In spite of the size and importance of the foundry industry, it has come only recently to a realization of the need for a vital approach to marketing. Even foundries which employ the latest and most efficient production techniques often lack planned marketing programs. Monarch Aluminum Mfg. Co. for many years has used the marketing concept to develop a basic plan of operation, which is reviewed annually

Marketing Aluminum

The first two articles in this series described Monarch Aluminum's permanent mold and diecasting operations. This concluding article explains how a marketing program sustains profitable production

● THE TWO previous articles in this series highlighted Monarch's permanent mold and diecasting operations. To sustain a profitable level of production geared to the capacity of our facility, a carefully planned total marketing program is required.

Many years ago before the word "marketing" became synonymous with sound management planning, we used the marketing concept to develop a basic plan of operation which we continue to review each year. This market philosophy is quite simple: An honest appraisal of our company activities and our competitive influences; our existing capacity and capabilities; current and future market conditions; and, last but most important, our future company ambitions.

From this basic philosophy we develop a complete program thoroughly considering every incidental factor that will assure us the results we wish to achieve. The impetus for any foundry to set up a strong marketing policy can originate from any one of the four factors we consider in our planning. Each of these factors should be considered individually and in greater detail.

Appraising Current Activities — Only rarely does any foundry find itself completely satisfied with its current operations or competitive situation. Too many factors constantly are involved that require special effort and attention. Ours is a growing industry sparked by new techniques, new types of equipment, and vast new market opportunities. One of the first factors we must consider constantly is the need for plant modernization and improved methods.

Monarch, for example, was founded in Cleveland in 1913 and over the years has developed a large investment in plant facilities in a strategic location. A large percentage of our employees enjoy an unusually long record of employment and are deeply rooted in their home life in the immediate area. For this reason we have taken every possible step to modernize our facilities in keeping with the latest methods available compatible with our operation. This modernization has been illustrated clearly in the two previous articles.

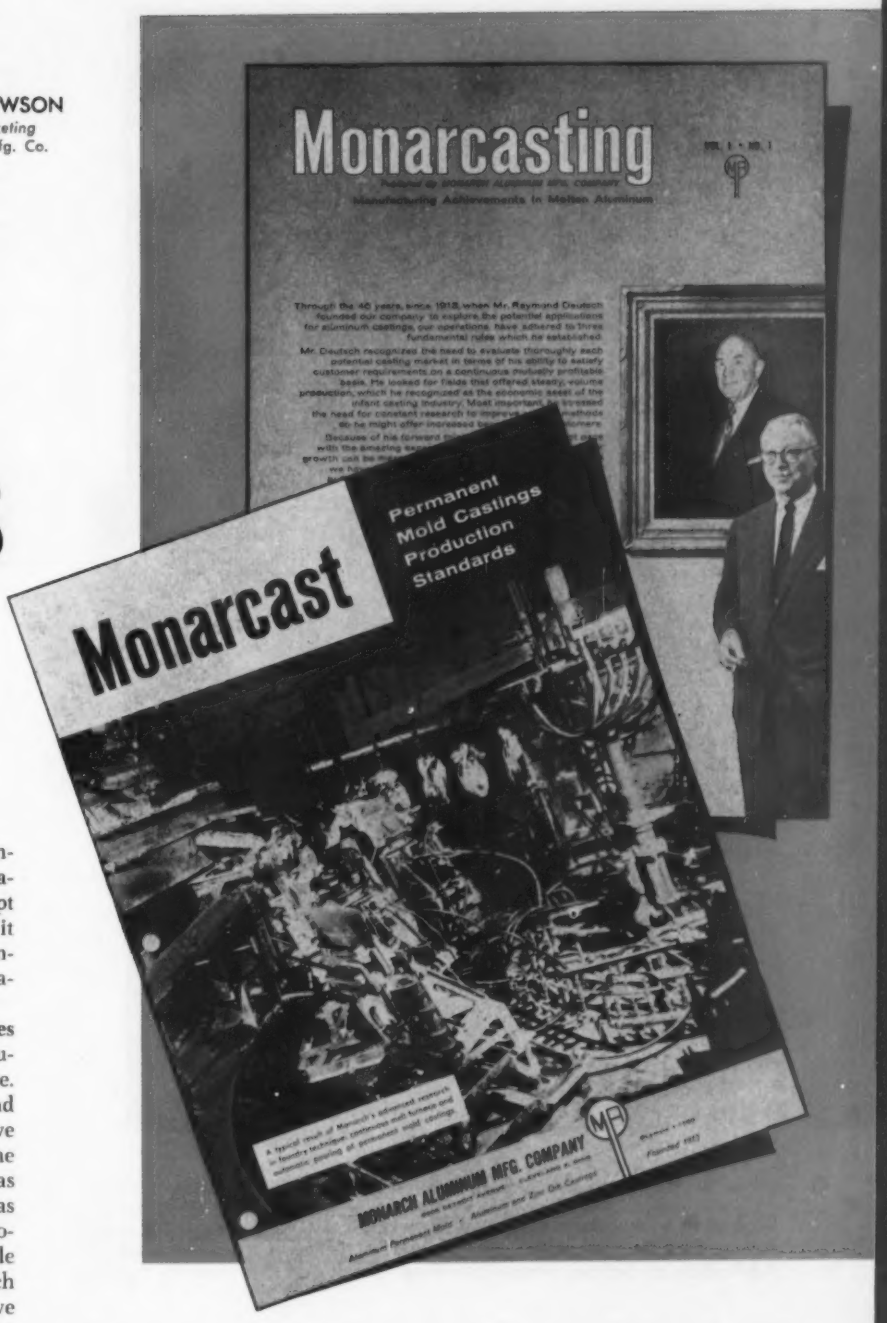
Conversely, many foundries have found it necessary to relocate and build new facilities to keep up with production expansion, technological progress, manpower needs, competitive situations, and relocations of their existing markets. This relocation can be a very costly problem, one which fortunately has not affected our company.

We make every effort to appraise our past performance and our present activities from the most important standpoint—customer relations. Incidental conditions that arise during the year are corrected to the best of our ability as the situation demands. If we find a recurrence of any situation adversely affecting our customer relations, we immediately analyze the problem and take steps to improve our methods of operation in this area. We continually review our operating procedures in an effort to maintain a high level of customer relations.

Employees also must be customer oriented in their thinking. Success in this area will aid materially in meeting competition. Sound operating policies which have created good customer relations automatically should insure satisfactory profit margins. Competitive influ-

By RUSSELL A. LAWSON
Vice President, Marketing
Monarch Aluminum Mfg. Co.
Cleveland

Castings



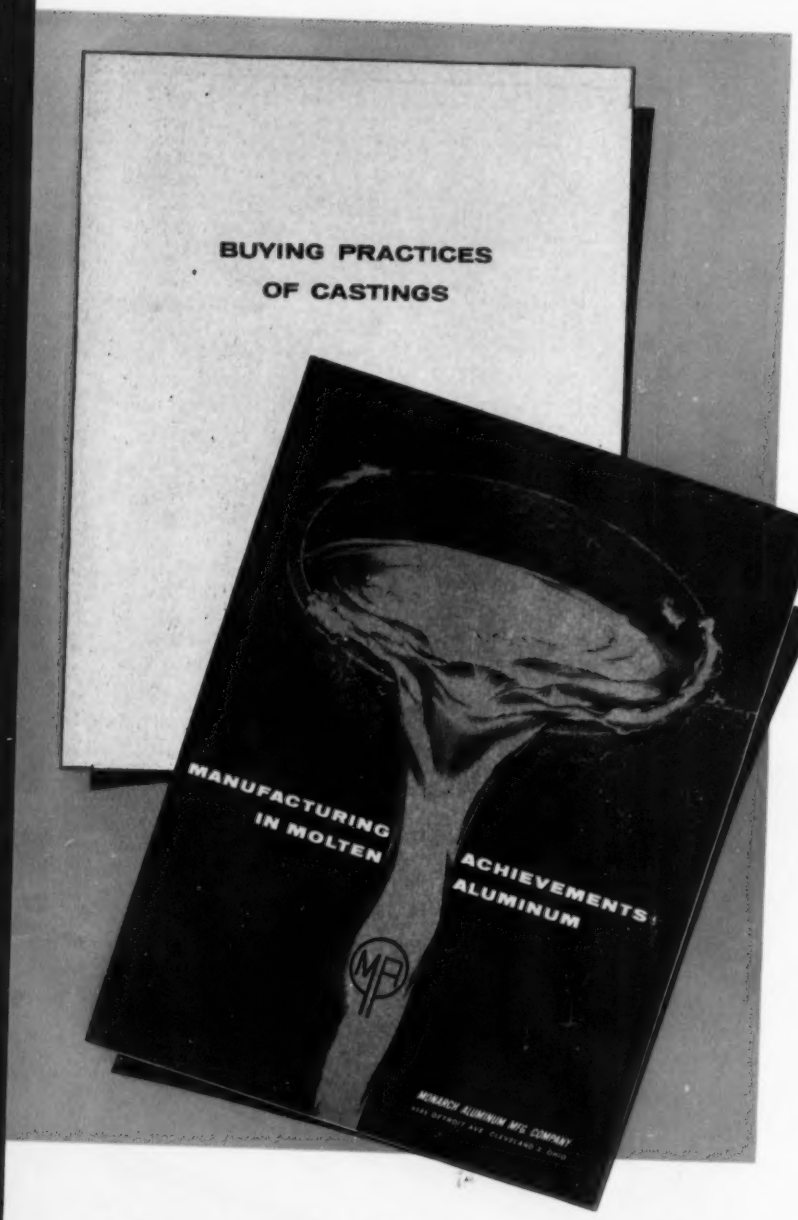
Marketing and sales aids include, top, external house organ and, bottom, a booklet presenting production standards for permanent mold castings

ences extend much deeper than individual competitive price situations. Very often foundries attempt to compete in markets in which it is beyond their capacity to maintain competitive profitable operations.

Appraising Existing Capabilities—Monarch was founded to manufacture cast aluminum cookware. Since then, technical experience and development of new methods have opened many allied markets in the consumer product field. Whereas the foundry industry generally has looked to automotive casting production as the most desirable single market for volume sales, Monarch has developed equally attractive markets in other industries. The facilities and knowhow required in these markets are not compatible with the requirements that guarantee success in the automotive field. Thus our marketing policy never has been based on automotive volume.

By thoroughly recognizing our capabilities and their adaptability to nonautomotive markets, we have been able to concentrate on production methods and capacity best suited for our plant. A thorough knowledge of the industries we have served successfully has provided the incentive to develop and expand the scope of our services to these industries. It is highly important that every foundry increase its capabilities. This policy is the best insurance against competition within our own industry or from other forms of fabrication or new materials.

Monarch has developed many new operating methods in both foundry techniques and finishing methods to expand existing services to its customers. Each innovation



Booklet at top contains results of a survey made for Monarch by a consulting firm to determine existing and potential markets for castings. Publication at bottom summarizes data about company and its facilities

has underwritten additional business in its existing market and has created interest from new markets currently foreign to the foundry industry. Whenever new techniques are developed, the resulting business must benefit the entire plant operation to keep productive capacities in balance.

Market Conditions—During the last few years, the foundry industry has suffered acutely from the ups and downs of the national economy. This fluctuation can be traced to a lack of proper diversification in the industries served by the average foundry. Automotive casting business again is a good example of this condition. Even in good productive years, automotive business is not a full 12-month market because of yearly model changeovers. Design changes are becoming more frequent, involving heavier tooling programs.

By contrast, Monarch has developed wide diversification, and concentrates on markets which continue, year after year, without extreme model changes. Markets are chosen for concentrated sales effort after exhaustive study of the market potential to determine that the requirements can best utilize our total services.

Regardless of the economic situation, markets always are available to the foundry which is equipped to help its customers manufacture a better product profitably. The emphasis must be placed on increased service and new techniques. Supplying the existing product at a lower price is not the answer. We seriously study market trends in major manufacturing industries to keep abreast of new product developments and estimated markets for existing products.

When industry sales objectives have been established, every effort is made to communicate intelligently with present customers and prospects to exploit the services Monarch can offer. We have used industrial magazine advertising and direct mail advertising successfully for the last 14 years to tell the Monarch story. Recently, we have added an extensive public relations program to round out our activity. Every effort is made to show the extra benefits we can offer the customer and to see that this information reaches the proper markets and personnel.

On the basis of the current economic situation, we determine the volume of business annually that will give us a uniformly profitable production operation. We then select the sales markets we feel can support this productivity best in relation to their own economic situation. During the last few years, this policy has required major readjustments in our sales policies and a continued refinement in our field sales operations. We firmly believe in selective selling, often in limited areas within reasonable lines of communication, rather than shotgun selling which usually covers a wide area of operation with-

out consistent end results.

Future Company Ambitions — Every foundry must have definite ambitions to maintain successful operations. Ours are quite simple —namely, to serve our customers so that both of us can profit. This goal requires constant forward thinking and planning. It requires a confidence in our industry and its future. Such confidence can be built only on the contributions we individually make toward the progress that lies ahead of us.

Our advanced market operations are geared to recognize future trends in the use of materials and manufacturing processes. Close attention is paid to the sources of initial design concept: Industrial design organizations, production design engineers, and the advance market predictions of the various metal institutes, etc. From this market research we choose the most likely product areas and apply our research, sales, and sales promotion efforts to these markets. Every means of communication and market analysis is employed.

In our industry it is common knowledge that one has to run to stand still. For this reason we constantly must involve ourselves in some phase of research to meet the market demands of tomorrow. This research requires close teamwork between all aspects of company operation. It involves imagination and confidence in the future. Over the years, Monarch has maintained a research program which has been singularly successful in introducing new foundry techniques, improved finishing methods, and complete new processes such as Velvaglaze and Porceglaze. The latter is application of porcelain enamel to aluminum permanent mold castings. Many new developments still lie ahead, each geared to predetermined market applications.

In the establishment of a market policy, it is obvious that it has to be tailored to existing facilities and profitable operations. It is equally important that this market policy include plans for expansion, both physically and marketwise. Any effort expended in setting up a successful marketing program must come from within the organization, through the co-operation of all phases of management.

Advertising and public relations play an important part in marketing. Reprint of a business magazine article, top, publicizes a new development, and advertisement, bottom, carries through with the same message

If there are any basic rules to follow, these unquestionably are the most important:

1. Tailor the objectives to your company's efficient economic manufacturing potential.

2. Develop a broad base for new services as the metal producers have done in increasing materials applications in new markets.

3. Start a progressive program of product and service research.

4. Plan the necessary means to reach new markets by first evaluating the total marketing concept and then re-evaluating existing sales policies and activities.

5. Tailor your program to fit your current operations. It must be flexible to meet the existing economic conditions, and it must have strong management leadership which is sympathetic with the total marketing concept.

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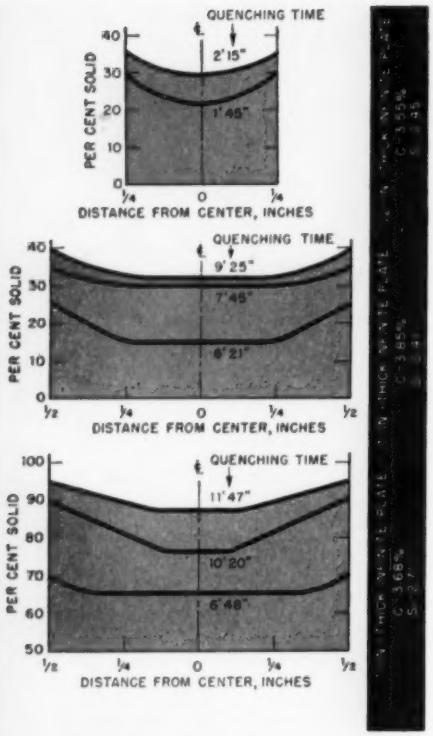


Fig. 14 — Solidification characteristics of ductile iron plates

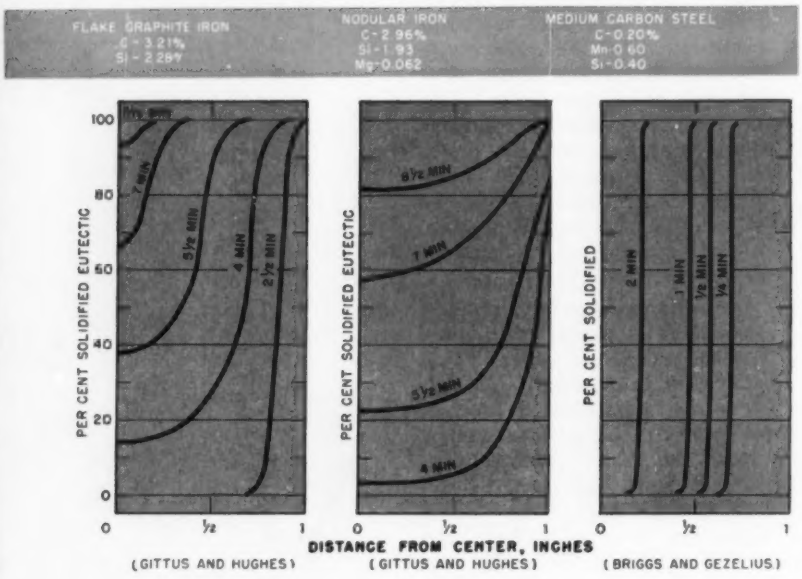
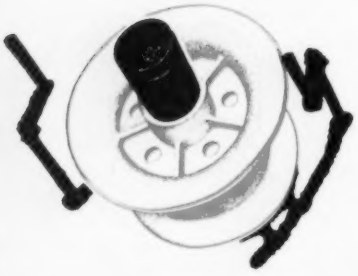


Fig. 15—Solidification characteristics of typical iron-carbon alloys cast in 2-in.-diam cylinders show that ductile iron does not freeze in layers from the surface inward as do gray iron and steel



RISERING of Ductile Iron Castings

Freezing, shrinkage, and feeding distance characteristics of ductile iron are discussed in relation to risering requirements in dry and green sand molds. This is the sixth article in a series

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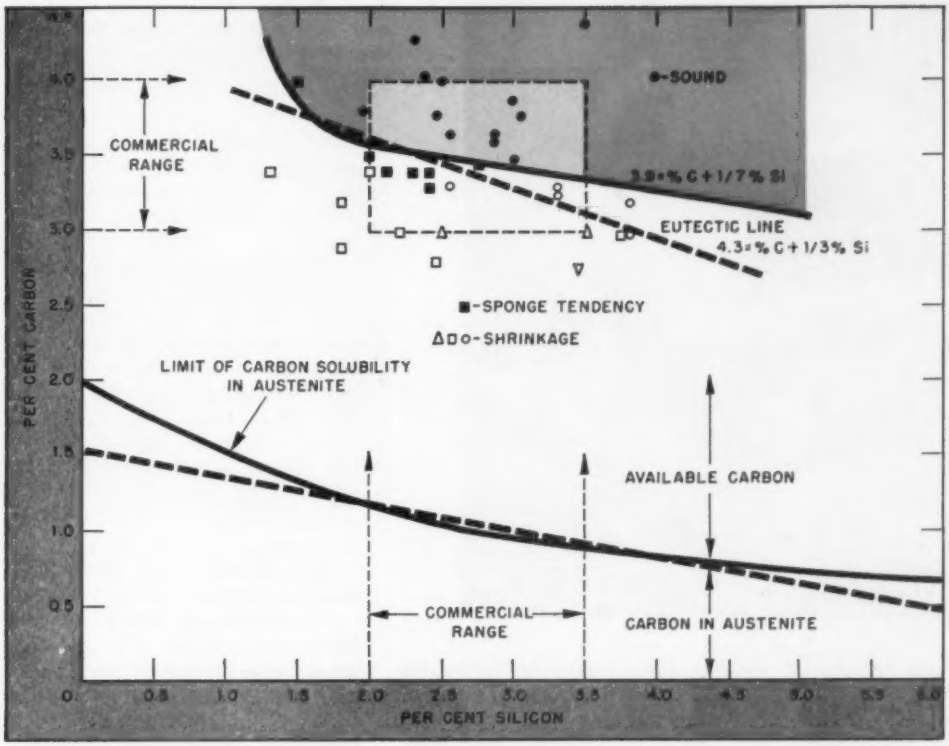


Fig. 16—Effect of composition on interdendritic shrinkage of ductile iron. Adequate graphite, influenced by silicon and carbon, eliminates shrinkage problems

● KNOWLEDGE of the shrinkage characteristics of ductile iron is vitally important to proper risering. Reynolds, Maitre, and Taylor[5] determined the solidification sequence of ductile iron, Fig. 14, by comparing the amount of solid and liquid throughout the casting at various times during solidification. Fig. 15 shows that ductile iron does not freeze in layers from the surface inward, as steel and gray iron do.

These figures show that there is a very small difference in the percentage solid at the center and edge of a casting and that some liquid is at the surface during most of the freezing process. Ductile iron tends toward instantaneous solidification, and gross shrinkage will occur if it is not closely confined.

Factors Involved—The total volumetric shrinkage of ductile iron is a function of four factors: 1. Liquid contraction. 2. Graphite precipitation. 3. Solidification shrinkage. 4. Mold cavity deformation.

Ductile iron is basically a hypereutectic iron. On cooling, some of the carbon precipitates as graphite, which occupies additional space. This characteristic counteracts liquid contraction. The percentage of graphite by volume can be found by multiplying the percentage of carbon by weight in excess of that soluble in solid iron by 3.54.

If the metal is poured with any degree of superheat, the percentage of liquid contraction is increased by 1.6 per cent for each 100 degrees C of superheat. Ductile iron poured at 2600° F when its freezing temperature is 2100° F has 500° F (260° C) superheat. The volumetric shrinkage of this iron would be $1.6 \times 2.60 = 4.14$ per cent. The percentage of graphite by weight necessary to counteract this contraction would be $4.14 \div 3.54$, or 1.169 per cent. With the normal composition of ductile iron, this amount of graphite is available.

According to Keverian, Taylor, and Wulff,[6] alloys containing spherulitic graphite have a greater tendency toward undercooling than normal gray iron. At extremely high carbon equivalents, cementite may appear in preference to graphite because of a greater tendency to undercool. This cementite ties up the carbon, causing more shrinkage to take place.

Under normal cooling conditions and proper chemistry, however, graphite will precipitate from the liquidus down to the eutectic temperature, where solidification takes place, forming austenite with some cementite. On further cooling, the graphite precipitates from the austenite, occupying additional space.

If there were no graphite available, the solidification shrinkage of ductile iron would be the same as that of steel—that is, 3.00 per cent. To offset this shrinkage entirely would require 3.00 per cent graphite by volume or 0.847 per cent by weight ($3.00 \div 3.54$).

Sponge shrinkage or interdendritic shrinkage occurs during the last stages of solidification and is eliminated easily by having adequate graphite available. C. C. Reynolds[7] has shown, Fig. 16, how this end can be accomplished. He has shown that silicon, although not as effective as carbon, plays an important

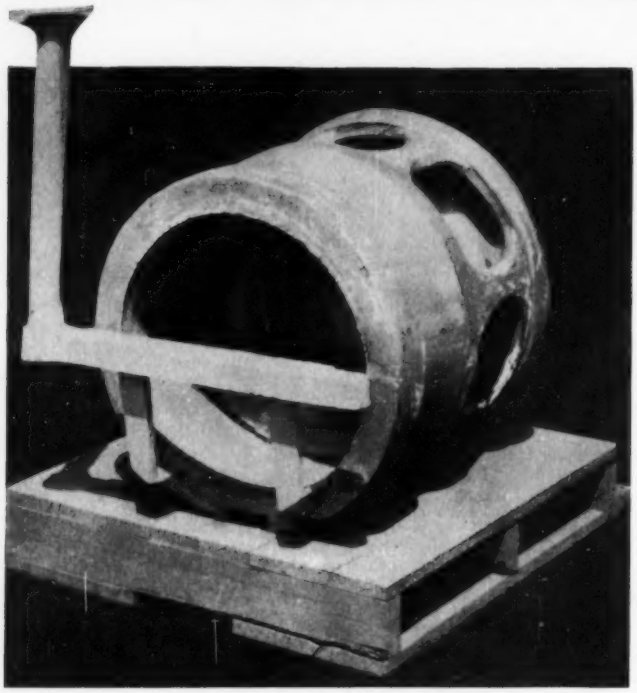


Fig. 17—This 600-lb driving wheel and hub was cast satisfactorily in dry sand without the use of risers

part in determining the amount of graphite available by changing the solubility of carbon in austenite. From the data plotted, it was found that a straight line separates the sound and sponge shrinkage areas, and it has an equation: 3.9 = % total carbon + 1/7% silicon.

This fact means that silicon is only one-seventh as effective as carbon in its effect on the sponge shrinkage tendency in ductile iron castings. This information points out the importance of carbon and temperature control to obtain sufficient graphite to counteract effectively the occurrence of sponge and gross shrinkage.

Dry Sand Molding—Mold cavity deformation plays an important part in shrinkage. In dry sand or baked molds, enough graphite is available to counteract shrinkage from liquid contraction and solidification when pouring temperature and chemistry are controlled as previously shown. It is most effective in reasonably uniform castings of heavy section in which undercooling does not take place.

Fig. 17 shows a 600-lb driving wheel and hub made in a dry sand mold with extensive coring. It was made without risers. This casting must be absolutely sound because of high stress requirements. The fact that thousands have been produced satisfactorily demonstrates the feasibility of casting intricate parts without risers. Web-type gear blanks and flywheels of weights from 50 to 23,000 lb have been made successfully in dry sand without risers. Many other castings too numerous to mention also have been made successfully without risers in dry sand.

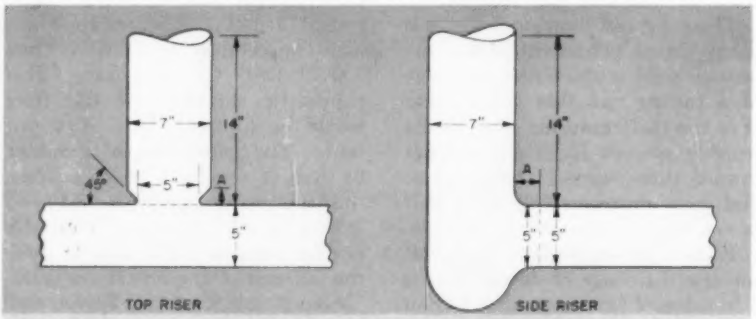
When section thickness of a casting varies extremely, the thin section solidifies before the heavy, producing sponge shrinkage. This problem usually can be eliminated either by insulating the light section or chilling the heavy section to promote uniform cooling throughout the casting at a rate that will permit graphite precipitation to counteract total shrinkage effectively.

Green Sand Molding—Reynolds, Maitre & Taylor[8] in their study of mold wall movement have pointed out that there is a general tendency toward increased wall movement with increasing section. The slope of the curve is 0.003 in. of surface movement per inch of section size. Castings made in green sand have, in general, 1.3 per cent more shrinkage than those made in dry sand.

The importance of green sand mold preparation can be appreciated by remembering that ductile iron has a tough plastic skin and that some liquid is present throughout the casting during most of the solidification. This condition permits the casting to deform or follow the mold wall movement. Sufficient graphite is not available to compensate for a large increase in shrinkage due to mold wall movement. As a result, external feeding is necessary in most cases.

Considerable work has been done, however, to improve the properties of green sand to make it more compatible with ductile iron. When the mold hardness is increased to

Fig. 18—Typical top and side riser configurations are sketched and formulas suggested for determining suitable dimensions for the risers



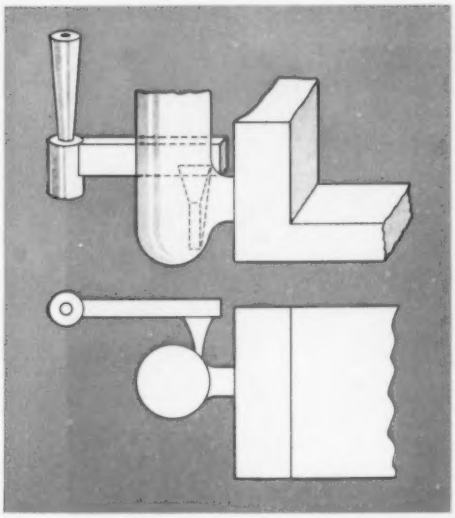


Fig. 19—Sketch of swirl gate on a side riser with suggested configuration to reduce turbulence of first metal flow

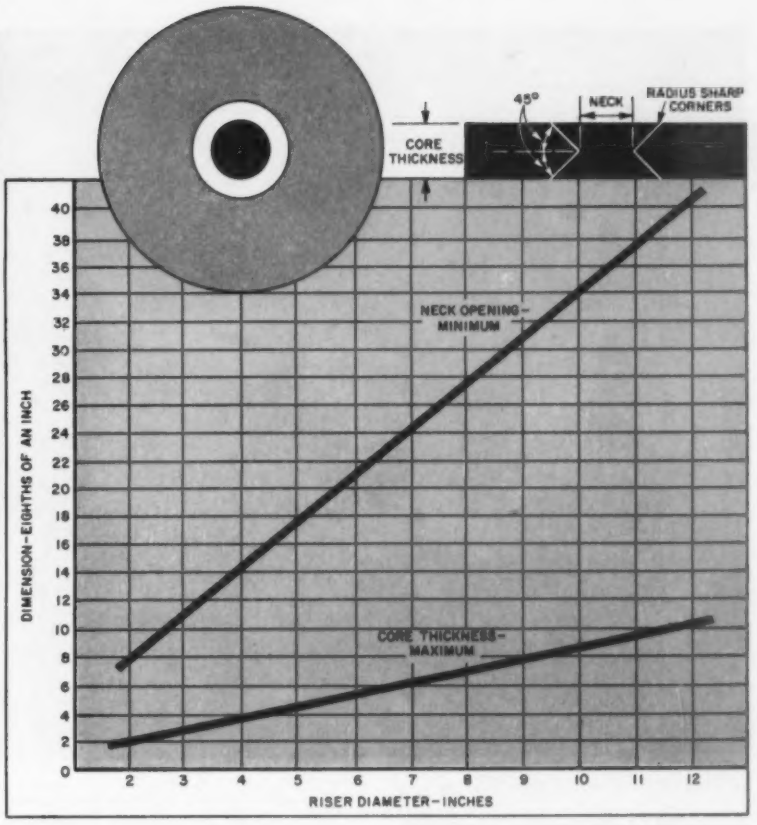


Fig. 20—Diagram of a Washburn core for easily-removed risers is shown at top. The chart suggests core dimensions for risers of various diameters

more than 90, in preference to around 70 as is usual in molds for gray iron, mold wall movement is decreased. This step may require a reduction in total fines so that the metal will lie quietly on the sand.

Hot strength should be increased in most cases, preferably to more than 50 psi at 1000 to 1500° F, to help withstand the prolonged fluid state of the metal. Green and dry deformation should be controlled below 0.020 in. per inch. Suffice to say, the mold should be supported by well fitting jackets and properly weighted.

Several ductile iron producers have increased their green sand shop yield considerably by developing a green sand for ductile iron. One foundry in particular, making production runs of fairly uniform small castings, has increased shop yield from 35-40 per cent to 70-75 per cent by developing a good sand for ductile iron.

Riser Dimensions—Formulas for arriving at suitable dimensions for risers, together with sketches of top and side risers, are given in Fig. 18. Risers of this design are satisfactory for use with green sand molding when the mold wall movement requires feed metal in addition to that available by graphite precipitation. This type of riser also will insure sound castings produced from hypoeutectic ductile iron, in which graphite does not precipitate from the liquidus to help feed the castings.

Although hypereutectic ductile iron is a self-feeding iron, some areas in castings must be fed even in well prepared dry sand molds. Areas such as are encountered in the junction of heavy and light sections where the inscribed circle of the junction is greater than either section must be fed. Corrections in diameter and height may be made after the amount of shrinkage and solidification speed for a casting has been determined.

Gating in Risers—The use of a swirl gate on this type of side riser is very effective. The most effective method to introduce ductile iron to a riser is to consider the riser as part of the casting and use the 4:8:3 gating system for proper

Fig. 21—Example of the application of Washburn-cored side risers on a crankshaft casting

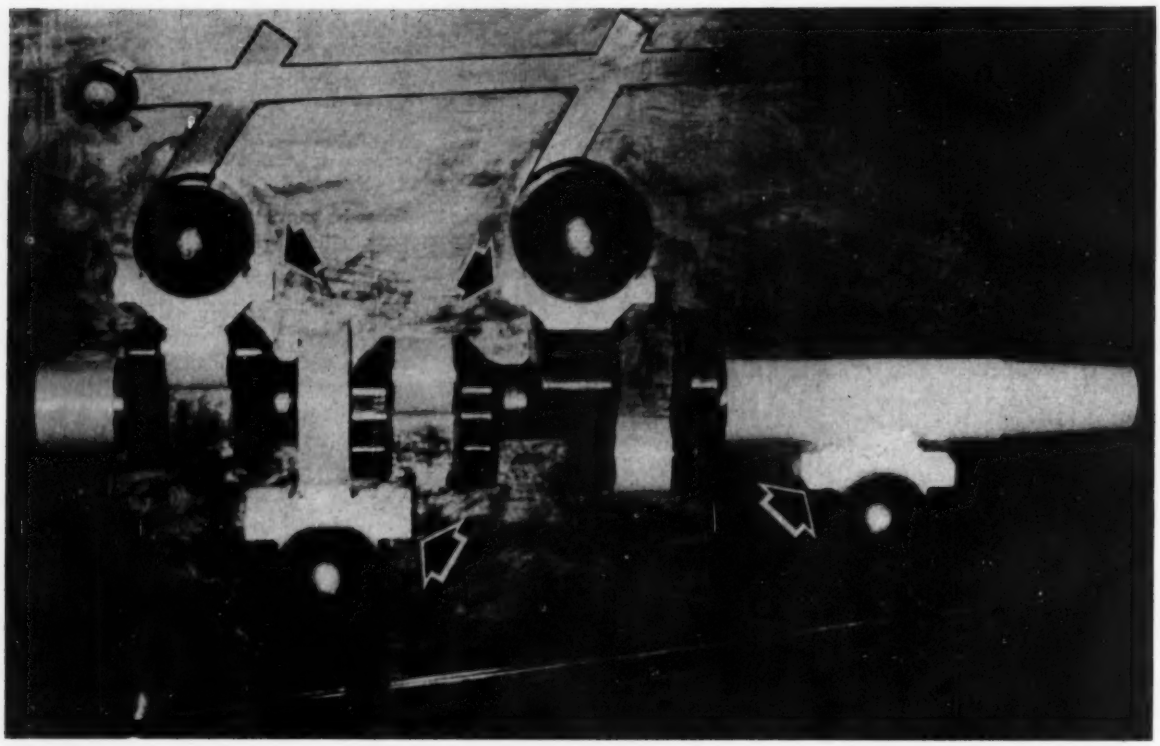


Fig. 22—Arrows point to the pattern print arrangement for Washburn cores which have the casting contour as well as the riser contour. In this example, the casting cavity is gated to be fed through the risers

skimming of the metal. The entrant to the riser should, if at all possible, be perpendicular to the riser neck to retain any slag generated in the riser. Fig. 19 illustrates this method and shows that the ingate is reversed from a horizontal position at the runner to a vertical position at the riser with all of it in the drag portion of the riser to reduce turbulence of first metal flow.

Feeding Distance—It has been determined by Flinn & Spindler[9] that the effective feeding distance for plates with $\frac{1}{4}$ to 2-in. sections in green sand molds is 4.5 times the section. This finding has been substantiated commercially in sections up to 3 in. In most instances, this problem is not serious. In uniform-section castings, however, such as small gear blanks, flywheels, etc., there is a tendency to place risers too close together, resulting in one riser's feeding excessively to shrinkage, whereas other risers may be sound.

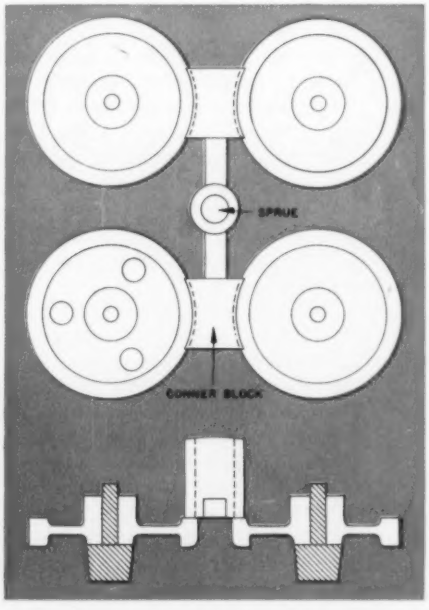
In dry sand molds, circular or bar-type castings of uniform section do not need risers. Armature core castings with a $6\frac{1}{2}$-in. section, 19-in. face and $4\frac{1}{2}$-ft diameter are made perfectly sound without risers. This part is equivalent to a bar more than 14 ft long. Any shrinkage present would be found quickly because variations in the electrical resistivity would result.

Blind Risers — Because of the tough plastic skin, riser tops exposed to the atmosphere work more effectively when they are covered with insulating material. Blind risers are more efficient when the top is flat or even concave, rather than convex, so that atmospheric pressure can be more effective. Blind risers at heavy sections in the bottom of a mold cavity work satisfactorily since the atmosphere exerts effective pressure on the thin plastic skin.

Washburn Core—The use of a Washburn core for the riser neck is a successful method of attaching a riser. The solid-contact riser is relatively difficult to remove in the cleaning room without notching or burning off. With the Washburn core, the riser is knocked off easily without tearing into the casting.

Fig. 20 shows a diagram of the Washburn core and a chart which permits rapid determination of the

Fig. 23—Method of gating gears with Conner-Block risers. Also shown is a solid chill with a print to hold the small core



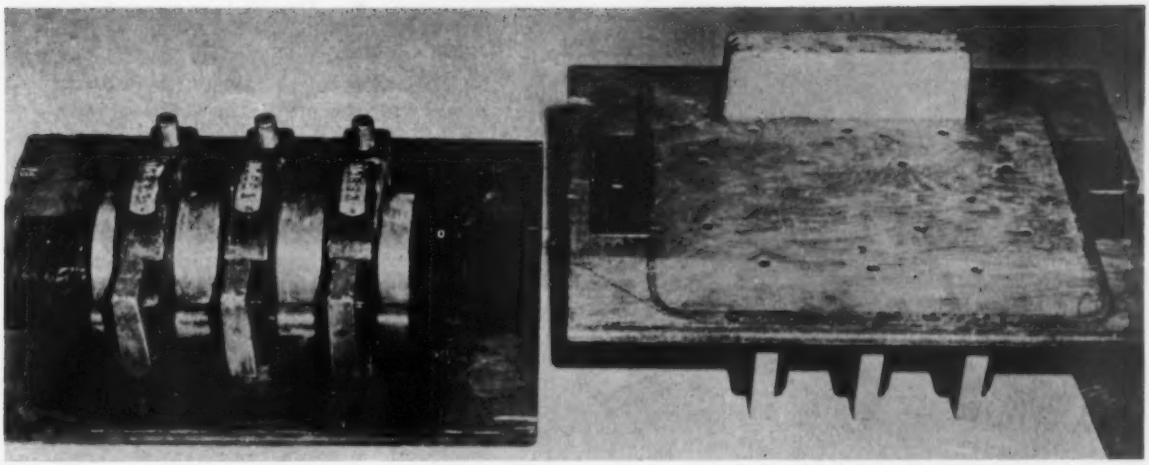


Fig. 24—Bearing cap pattern with Conner-Block riser former at right. The riser feeds into ends of caps, left, having the core print protuberances

dimension of the core. Fig. 21 illustrates the use of this type of riser connection on a crankshaft casting produced x-ray sound for a critical application. Fig. 22 shows the pattern print arrangement to insert a core that contains the casting contour as well as the riser contour.

As can be seen, the crankshaft is fed through the risers. These risers are removed easily. If solid-contact risers were used, considerable time would be required to produce the contour necessary on this casting.

Conner-Block Risers—The Conner-Block riser performs very well and is finding increasing applications. Its use requires good flask and pattern equipment to assure accuracy. The area of the thin overlap of the riser on the casting is critical. The overlap is 1/16 in. and must not exceed 3/32 in. Length of the overlap is such that it will permit the casting to be poured at a rate consistent with good practice. Fig. 23, 24, and 25 illustrate use of the Conner-Block riser.

Since the effectiveness of this type of riser depends on heating the sand sufficiently around the contact area, consistent pouring temperature is necessary for consistent results. When a shrink does appear, it will look like a hot tear in the contact area extending the full length of the overlap. This difficulty may be overcome by reducing the length of overlap, thus slowing up the pouring rate and permitting the sand to absorb additional heat.

Feeding Versus Yield—The feeding problems in ductile iron founding are no more difficult than with other ferrous metals—in many instances, not nearly as difficult. By taking advantage of the solidification characteristics of ductile iron and utilizing the proper sand with improved molding techniques, one

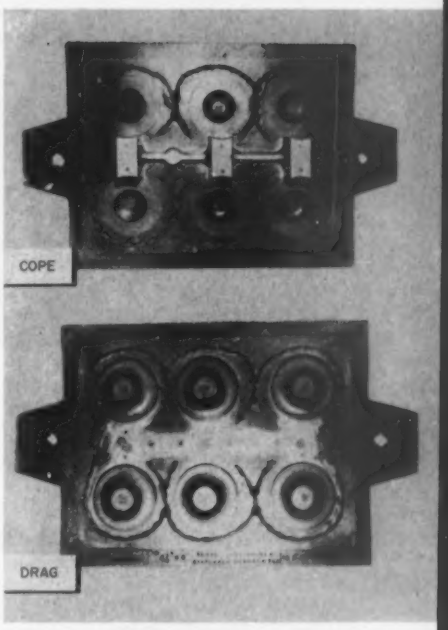


Fig. 25 — Wreath-like designs on this matchplate with Conner-Block riser formers are male-female sand seal patterns

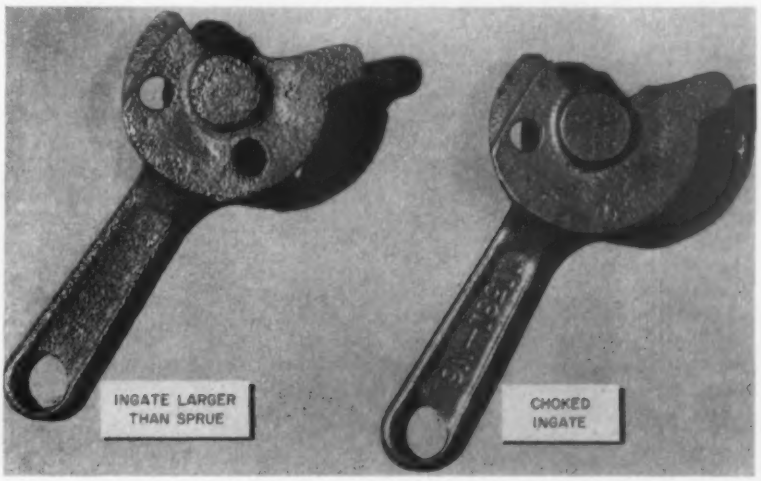


Fig. 26—Improperly choked gating system produced casting at left. A 4:8:3 system with the proper sprue-runner connection produced the casting at right

Fig. 27 — Dross defect caused by slow pouring, poor metal distribution, turbulent metal

can achieve mold yields superior to those achieved with other ferrous metals.

Types of Defects—Most defects encountered in ductile iron castings can be attributed to poorly designed gating systems. Defects such as those shown in Fig. 26 commonly are found in small castings which have not been rerigged for ductile iron. The casting on the left was produced by a gating system which was not choked properly and was aspirating the total length of the pour.

With installation of a system that conformed to the 4:8:3 ratio with the proper sprue-runner connection, castings were produced consistently like the one shown on the right. This type of defect often mistakenly is called pinholes, but is finely dispersed slag which was not separated from the iron by a properly choked and designed gating system. Pinholes usually are found in all surfaces of the casting and can be attributed to low-temperature, improperly inoculated iron in conjunction with excess moisture in the sand.

Fig. 27 shows the dross defect, which is more common to large castings. The casting surface may have a wrinkly appearance, laps, a shiny surface, or all of these conditions, depending on the degree of the dross defect. Close examination of the top edge of this rib section reveals all three of these indicators of dross, and the fracture shows that over 25 per cent of the area is filled with dross. This defective casting was produced by slow pouring, poor metal distribution, and turbulent metal flow.

Acceptable castings were produced when the pouring time was reduced, bottom gating was used, and more ingates were incorporated to reduce the length of metal flow. It does not pay to compromise on any of the steps necessary to produce good castings.

Fig. 28 shows the results of a well proportioned gating system which minimized turbulent flow, but did not have the proper metal distribution and proper pouring time. The metal flowed very quietly in the mold. The oxide film on the surface stuck at various places on the core and acted like a piece of asbestos paper placed in the metal section to separate it. This type of defect was eliminated by shortening the pouring time to reduce time in which the metal could oxidize in the mold and by installing more ingates to obtain good metal distribution.

These few illustrations show the result of compromise. Once the characteristics of ductile iron are understood and the proper techniques for handling it are known, clean, sound castings will be made. Compromise should not be tolerated.

Rigid inspection is good—good for the customer and for reduction of the foundry's scrap pile. Quality control with no compromise will reduce the foundry's scrap and greatly increase its profit.

References

5. C. C. Reynolds, J. Maitre, and H. F. Taylor, research sponsored at Massachusetts Institute of Technology by Ductile Iron Div., International Nickel Co., 1954-55.

6. Jack Keverian, H. F. Taylor, and John Wulff, "Experiments on Spherulite Formation in Cast Iron," *American Foundryman*, June, 1953, p. 85.

7. C. C. Reynolds, research sponsored at Massachusetts Institute of Technology by Ductile Iron Div., International Nickel Co., 1951-55.

8. C. C. Reynolds, J. Maitre, and H. F. Taylor, research sponsored at Massachusetts Institute of Technology by Ductile Iron Div., International Nickel Co., 1951-55.

9. R. A. Flinn and W. A. Spindler, research sponsored at University of Michigan by Ductile Iron Div., International Nickel Co., 1953-54.

Fig. 28—Even a minimum turbulence gating system can give results as shown below if metal distribution is poor and the pouring time is slow

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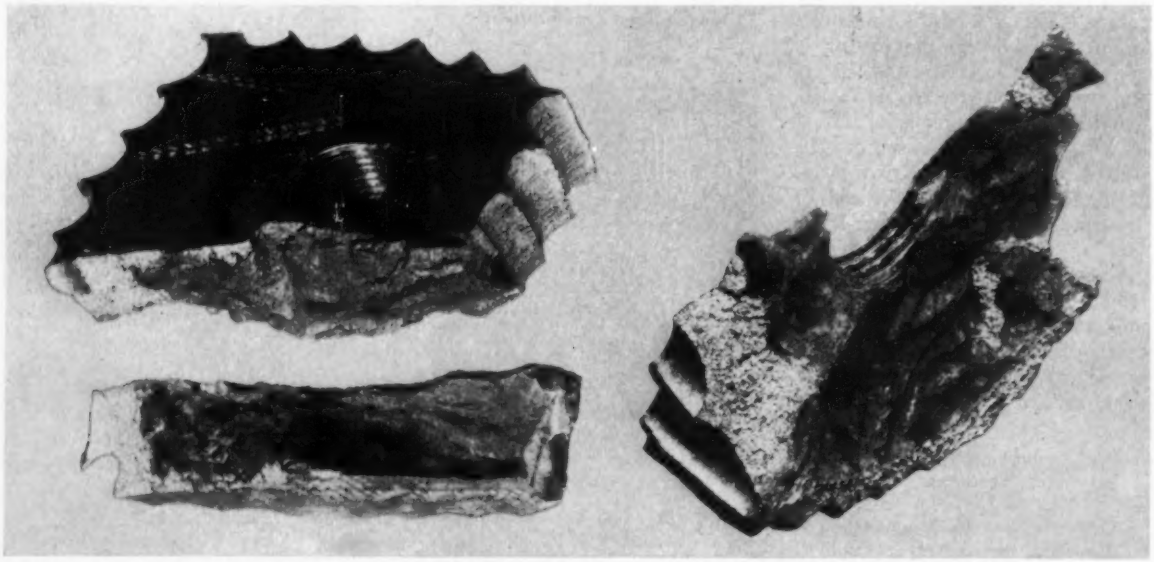

Automatic sand preparation system is combined with conveyor loop to produce molds and cores for castings up to 40 tons

Mechanizes Use of . . .

Cold Setting Sand Mixes

Fig. 1—General view of the automatic weighing and mixing system for preparing cold setting mixes

● A WIDE VARIETY of steel, alloy iron, Meehanite, and ductile iron castings for machine tools, hydraulic presses, and heavy machinery for the rubber, plastics, metals, paper, sugar, and other industries is produced at Farrel-Birmingham Co., Ansonia, Conn.

Facilities include modern molding and heat treating equipment; chemical, spectrographic, and metallurgical laboratories; pattern shops; and machine shops. Most of the castings produced in the company's foundries at Ansonia and Derby, Conn., are processed into finished products at those plants and in Farrel-Birmingham shops at Buffalo and Rochester, N. Y.

Castings weighing up to 80 tons are produced in cement and dry sand molds at the Ansonia foundry. Many of the castings require extensive coring. Cores are produced with a number of different binders, including the cold setting type. The company was one of the early users of this type of binder for cores and gradually expanded its use to the production of molds. To date, castings weighing up to 40 tons have been produced in sand bonded with cold setting binder.

Recently the company installed an automatic batching system for preparing the cold setting sand mixes and a conveyor line on which cores and molds are produced. Cores vary in weight from a few pounds to 6000 lb. A typical large core would be about 8 ft long x 4 ft wide x 3 ft high. Molds are in about the same size range.

Sand Preparation—The batching system for the generally used sand is automatic and is operated through a pushbutton control panel by the men making molds and cores. The panel contains the necessary switches, controls, and timers to adjust additions to the sand for various mixes. The system weighs dry ingredients, meters the oil binder, cycles the mixing, and discharges prepared sand automatically. All controls are interlocked and provided with fail-safe circuitry.

Heart of the system is a 15-cu-ft hopper suspension scale with air-operated discharge gate and levers, dial, and controls. Sand flows into the scale hopper through an air-operated feed gate at the bottom of a 10-ton overhead storage hopper. Iron oxide is fed from a 400-lb capacity hopper by small screw conveyor. Sodium perborate, the activator for the mineral-base oil, cold setting binder, is weighed by separate scale from a 100-lb storage hopper and fed into the larger scale hopper.

At the push of a button the preweighed materials are discharged into a paddle mixer and mixed dry

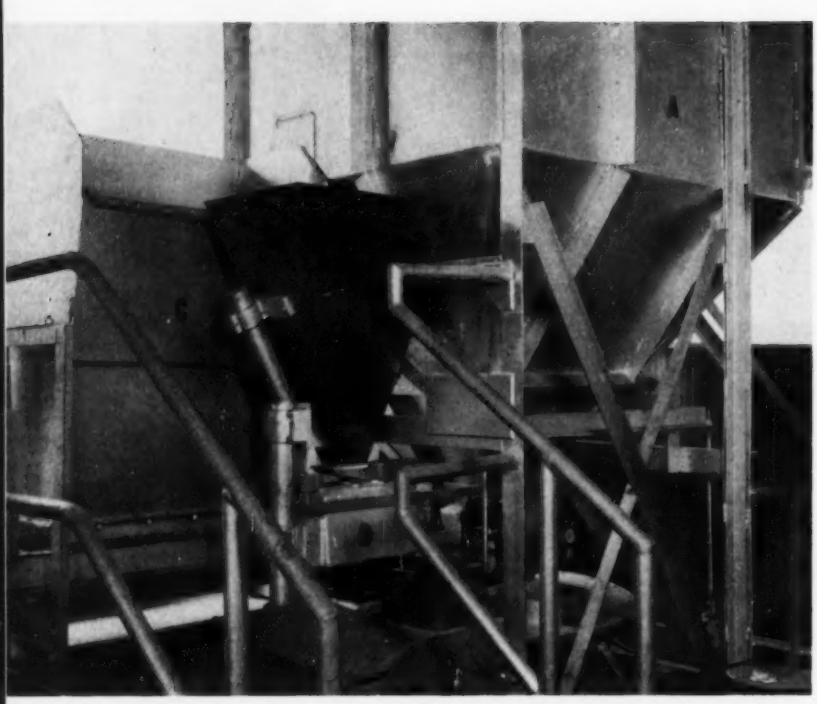

Fig. 2—Sand from bin A falls to weigh hopper B. Iron oxide is screw fed from bin C to hopper B. Impulse feeder, D, weighs activator to hopper B

for 10 seconds. Oil is added automatically from a storage tank on a timed-flow basis predetermined to provide the correct number of pounds. Mixing continues for 1 minute 35 seconds, for a total mixing cycle of 1 minute 45 seconds. Mixed sand is discharged into a receiving bucket having a manually operated clamshell gate at the bottom for dumping sand into flasks and coreboxes on a gravity roller conveyor underneath.

Batches consist of 1000 lb AFS No. 51 dried New Jersey silica sand, 18 lb cold setting binder, 15 lb iron oxide, and 6-36 oz (as required) sodium perborate. Binder content is reduced to 15 lb in the mix for certain cores used in production of large castings with light sections. Farrel-Birmingham has found that the use of iron oxide in the cold setting mix to prevent veining and penetration is so effective that the cost of the addition is more than justified.

A facing sand mixture consisting of 100 lb zircon sand, 1 lb cold setting binder, and ½ to 2 oz activator also is used in areas of molds and cores particularly vulnerable to metal penetration. The sand is weighed automatically in a scale hopper from an overhead storage hopper and dropped into a 130-lb capacity muller. The activator is added by hand to the muller and the mixture mulled for 15 seconds. Then the binder is added by hand, and mulling continues for a total cycle of 2 minutes. Prepared sand is discharged to a container and then moved to the point of use.

Sand used in preparing the mixes should be dry and at a temperature under 90° F. The amount of sodium perborate activator in the mixes varies, depending on sand temperature, humidity of the air, size of cores and molds to be made, and other factors. Sand mixing and core and mold making must be synchronized because the prepared sand has comparatively short usable life. The system at Farrel-Birmingham provides fast mixing, fast handling, and use of prepared sand at or near the point of preparation. The mix employed offers reasonable working life, yet sets fast enough to permit drawing the molds or cores after a comparatively short setting time.

Core and Mold Line—Fig. 4 shows the conveyor loop on which cores and molds are made. Coreboxes and flasks are placed on the conveyor at right, and reinforcing rods, if required, are set. Boxes and flasks then are pushed along the conveyor to the work station at lower left center, where workers place zircon facing sand mix if it is required. Then boxes and flasks are pushed to the 90-degree transfer section of conveyor at the far left. At this point they rest under the bottom-gated hopper, ready to receive the general use cold setting sand mix as shown in Fig. 5.

Very little ramming, as such, is required. Workers hand tuck sand

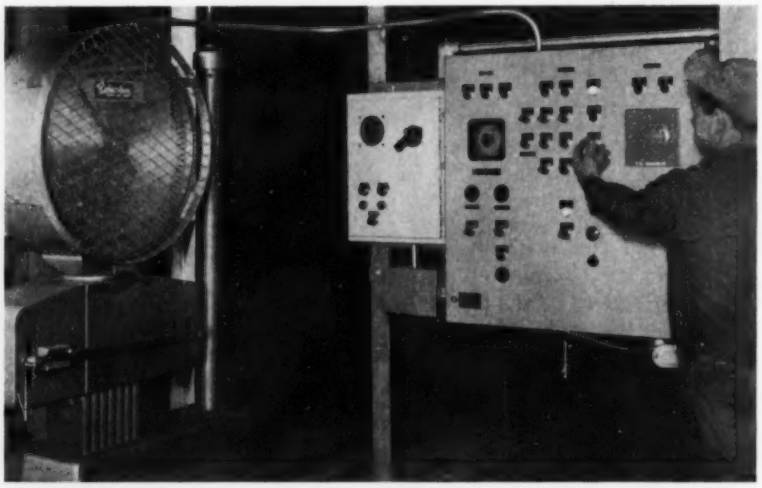

Fig. 3—Operator adjusts sand and additions for various mixes from central control panel. Weighing and mixing are automatic and continuous

Fig. 4—Boxes, patterns, and flasks are set on conveyor loop at right, reinforcing rods set, sand rammed at far left, and curing occurs on conveyor in background

under loose pattern pieces and in recesses. Bulk of the sand is hand-distributed throughout the box and left slightly high over the top of the box to allow for settling as the box or flask is rolled along the straight section of conveyor (top of Fig. 4) to the strike-off station. There the sand is rapped with a flat board, then struck off. Strike-off sand that has started to set is used as filler in some cores and molds.

Farrel-Birmingham believes that cold setting sand is too expensive at the present time for general molding use although it is used for certain jobs. In some cases, pattern equipment can be simplified sufficiently to justify the cost of the sand. In others jobs can be rigged to use a minimum quantity of sand so that the increased prepared sand

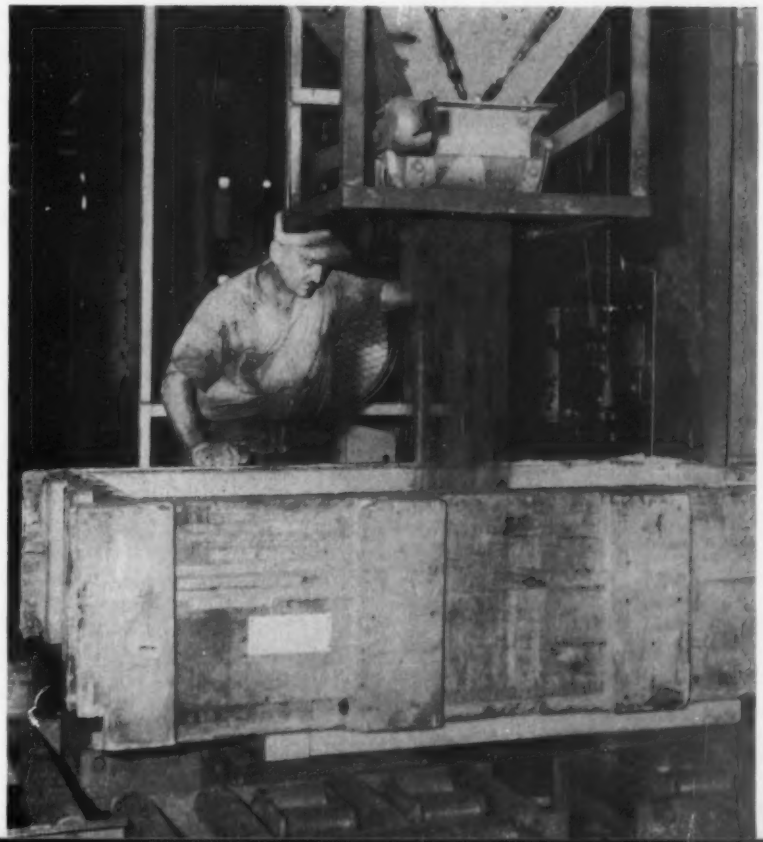

Fig. 5—This is a close-up of the ramming station. A corner of it is shown in Fig. 4, left

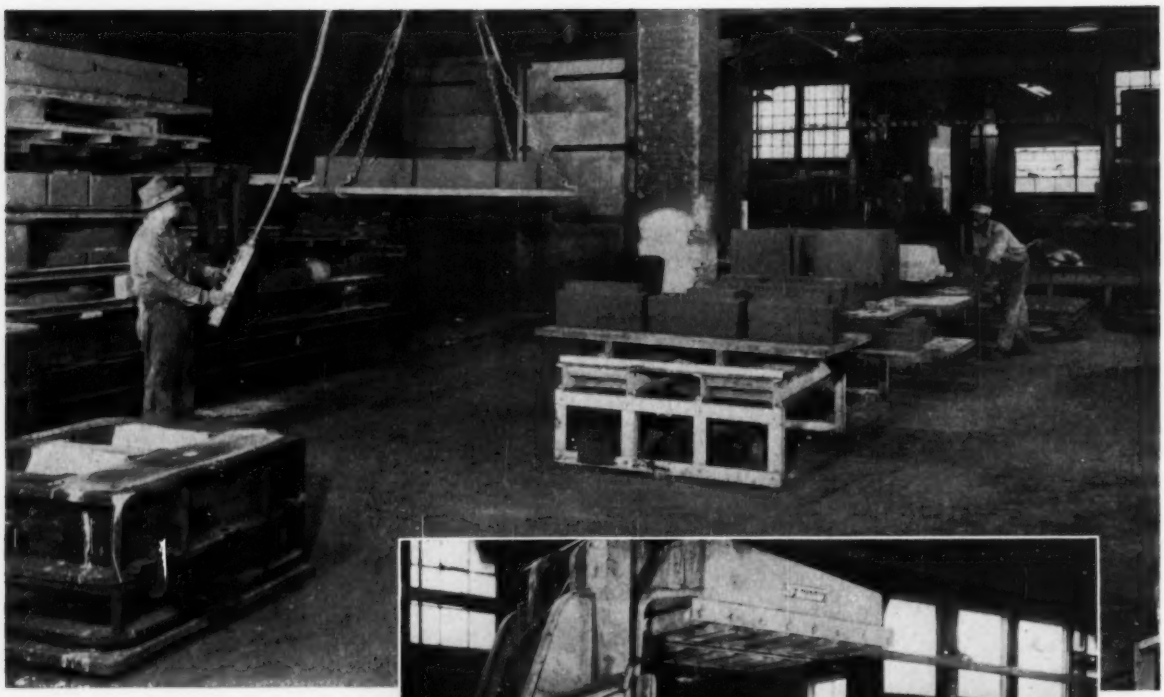

Fig. 6—Cores and molds are finished here prior to loading on oven car

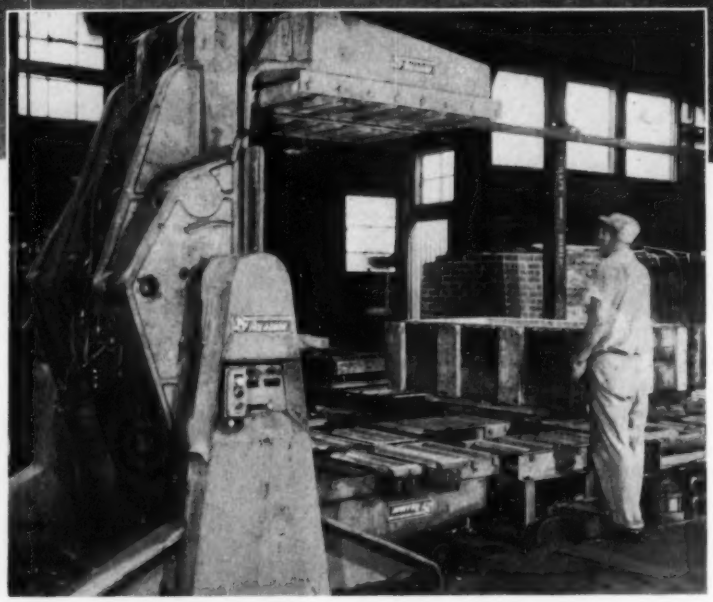

Fig. 7—Rollover machine draws cores and molds which continue out to left. Boxes and patterns return to processing conveyor as shown

cost is recovered in faster molding time, better shakeout, and improved casting surface finish. Also, patterns can be faced with cold setting sand and the flask filled with a comparatively inexpensive backing sand. Accomplishing this on an economic basis, however, required certain handling facilities that might nullify the saving realized. Molds have been made as an assemblage of cores when appropriate flask equipment was not available.

Following strike-off, cores and molds are pushed along the conveyor to a 9000-lb capacity rollover draw machine capable of rolling and drawing a box or flask 88 x 66 x 30 in. high. During this interval the sand sets, permitting a satisfactory draw within ½ hr after the core is made. Setting time is hastened in some of the jobs by introducing dry compressed air.

The rollover machine returns patterns and coreboxes to the feed conveyor, where they are rolled back a few feet to a 90-degree transfer section. From there they are rolled to the loading section of the loop to be recycled or removed to storage.

Molds and cores, on bottom boards at this point, are pushed along the straight conveyor section to the finishing station shown in Fig. 6. Here they are coated with a zircon wash mixed to a consistency of Baume 70 for spraying and 80-85 Baume for brushing.

A worker uses a crane to lift coated molds and cores to a car for movement into an externally fired, recirculating oven. The baking time is 4½ hr at 370° F. Jobs up to 2000 lb molded in flasks in many cases can be cast without baking.

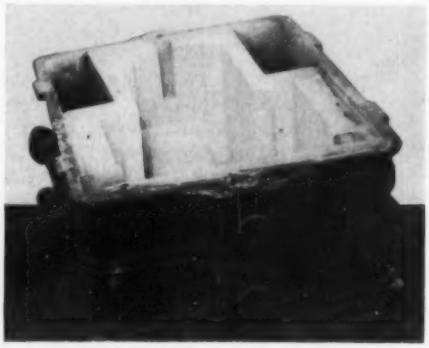

Fig. 8—Prepared sand is saved by blocking out corners of the flask as shown above

In some instances an unbaked drag is used with a baked cope.

Experience with Process—Farrel-Birmingham's experience indicates that the saving in time, the practical elimination of ramming and bedding in, the reduced manpower and less skilled help required, the reduction of rodding, and the improved shakeout permitted by the process more than offset the relatively high cost of the special binder sand mixture.

In addition, less expensive corebox equipment may be used because of reduced wear resulting from elimination of ramming. Cores produced have a high degree of accuracy with consequent reduction of rubbing and other finishing operations.

However, the foundry has realized no appreciable saving in baking time for cores. This may be due to the fact that oil sand mixes previously used contained a fast-baking oil. Also, cold setting sand mixes have not proved advantageous for bench work.

The advantages and economies cited pertain mostly to cores. Some molds have been made at an overall saving due to circumstances peculiar to the Farrel-Birmingham operation. Personnel of the foundry feel that some such circumstance is needed to justify use of the material for molding.

Sand Reclamation — Farrel-Birmingham has installed an air type reclaiming unit primarily for scrubbing cement bonded sand for reuse.

Preliminary tests indicate that the unit also may be used to reclaim sand coated with cold setting binder. Additional tests show that a loss of about 10 per cent in strength is experienced by the use of 100 per cent reclaimed sand of this type as compared to the use of all new sand. However, sample cores have shown adequate hardness and good surfaces.

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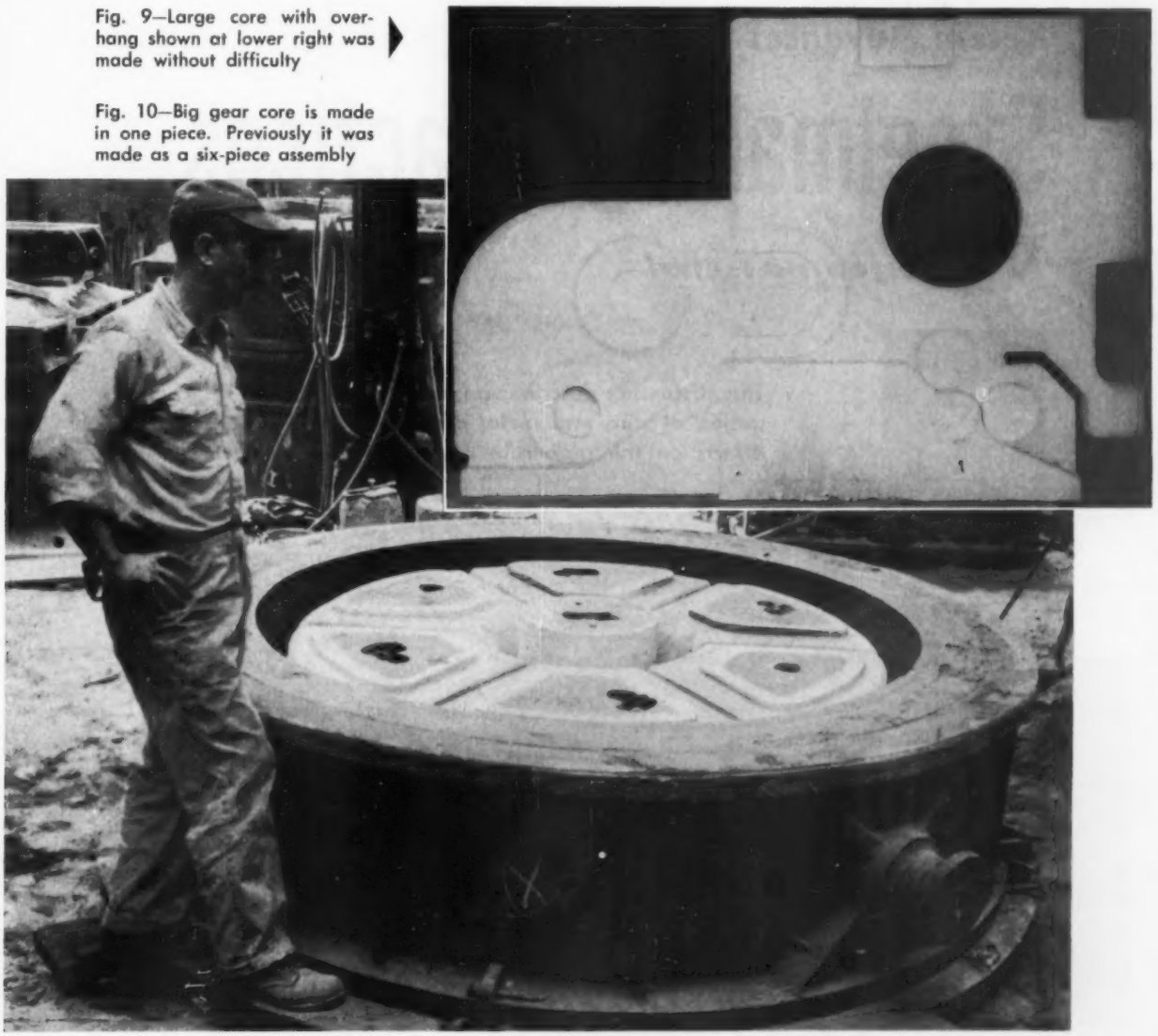
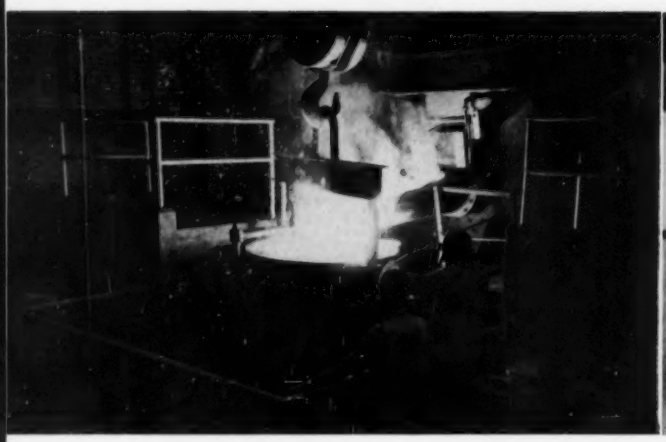
Fig. 9—Large core with overhang shown at lower right was made without difficulty

Fig. 10—Big gear core is made in one piece. Previously it was made as a six-piece assembly





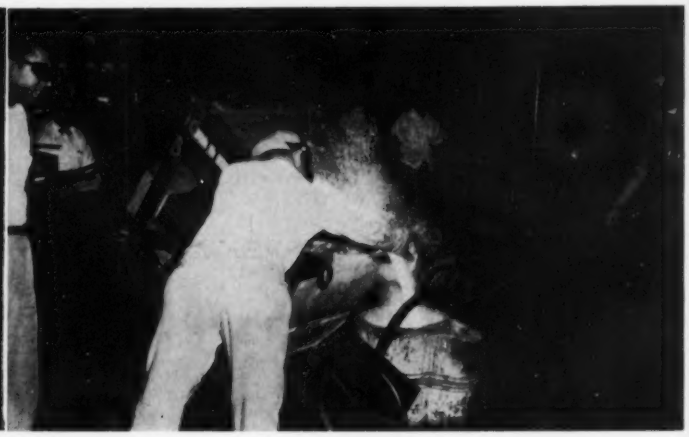


Fig. 1, left—Tapping a 6½-ton basic-electric steel furnace into a bottom-pour ladle. Fig. 2, right—Tapping a 500-lb induction furnace into a teapot ladle

Recent Advances in

Steelmaking Practices

At Watertown Arsenal

This discussion describes an extensive process evaluation of slag and metal characteristics and their effects on the properties of cast low alloy steels

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● IN RECENT YEARS, metallurgists have tried to determine what factors affect the ductility and toughness of cast steels and how controlled process variables can achieve their optimum mechanical properties. Rodman Laboratory of Watertown Arsenal has done extensive process evaluation of slag and metal characteristics and their effects on the chemical and physical properties of cast low alloy steels.

Recent work in the literature has pointed out three casting variables of interest to the metallurgist who is attempting to produce better castings: 1. Segregation. 2. Porosity. 3. Nonmetallic inclusions.[1]

To minimize the number of variables being evaluated at one time, the last item listed, nonmetallic inclusions, was the basis for the initial Rodman Laboratory investigations. Further restrictions narrowed the field of interest to maximizing dephosphorization and desulfurization of steels to study how removal of these two detrimental elements affected physical properties of cast steels.[2]

The second process variable of interest to the metallurgist is the effect of vacuum conditions on the chemical and physical properties of cast steels. Investigations in this area also have been initiated, and significant results will be forthcoming in the near future.

Chemical and Physical Properties—Recent work in the literature correlates slag and metal characteristics existing during a basic-electric

steel melting process with the dynamic dephosphorizing and desulfurizing powers in such systems.[3] Equations relating the dephosphorizing and desulfurizing powers as functions of two slag parameters are as follows:

Dephosphorizing power =

$$\frac{(P)}{[P]} = \phi_1 \left[\frac{(\%CaO)(\%FeO)}{(SiO_2)} \right]^{\phi_2} \quad \ldots [1]$$

and desulfurizing power =

$$\frac{(S)}{[S]} = \phi_3 \left[\frac{(\%CaO)}{(\%SiO_2)(\%FeO)} \right]^{\phi_4} \quad \ldots [2]$$

where (P) = per cent phosphorus in the slag; [P] = per cent phosphorus in the metal; (S) = per cent sulfur in the slag; [S] = per cent sulfur in the metal; (%CaO)/(%SiO_2) = slag basicity; (%FeO) = oxidizing power of the slag; and ϕ_1, ϕ_2, ϕ_3, and ϕ_4 = constants.

A comparison of equations [1] and [2] shows that while a constant basicity is maintained during the melting process, maximum dephosphorizing and desulfurizing conditions cannot exist at the same moment because of the opposite effect of the slag oxidizing power in the two slag parameters. Therefore, to remove both detrimental elements from steel, the melting process had to be separated into two portions—one part using a highly oxidizing slag (high per cent FeO) for maximum dephosphorization and the second part using a minimum oxidizing level in the slag (low per cent FeO) for maximum desulfurization. Such results could be realized with a well controlled, two-slag, basic-electric practice.

Reduction of both the phosphorus and sulfur contents of several steel castings to 0.010 per cent resulted in a significant increase in reduction in area, impact strength, and elongation while a constant strength level was maintained.[4,5] Additional work on the dephosphorization and desulfurization of basic-electric cast steels currently is being conducted at Rodman Laboratory to evaluate the effect of further reduction in these two detrimental elements on the chemical and physical properties of cast steels.

Because of results reported in the literature on dephosphorization and desulfurization in basic-electric furnace practice, an attempt was made to evaluate the effect of these slag parameters on the desulfurization of low phosphorus steel (approximately 0.015 per cent P max) with basic induction melting practice. Theoretically, the ionic reaction taking place between molten slag and steel is as follows:

$$\underline{[S]} + (O^{-2}) = (S^{-2}) + \underline{[O]}^{6} \quad [3]$$

where $\underline{[S]}$ = per cent sulfur in the steel; (S^{-2}) = per cent sulfur in the slag; $\underline{[O]}$ = per cent oxygen in the steel; and (O^{-2}) = per cent oxygen in the slag.

As this reaction approaches equilibrium, the equation for determining the equilibrium constant (K) is

$$K = \frac{(S^{-2})\underline{[O]}}{\underline{[S]}(O^{-2})} \quad [4]$$

A further assumption that the oxygen content of the slag attains a constant value (O^{-2}) = constant changes the preceding expression to

$$K' = \frac{\underline{[O]}(S^{-2})}{\underline{[S]}} \quad [5]$$

Thus, with the addition of deoxidizers such as ferrosilicon and/or aluminum to the steel bath under favorable slag conditions, per cent oxygen in the metal decreases and the K′ remains constant, but the ratio between per cent sulfur in the slag and per cent sulfur in the steel increases. This reaction indicates that optimum desulfurization of the steel is obtained after adequate deoxidation has been achieved.

This principle was the basis for the basic induction melting investigation initiated by E. J. Dunn Jr. and continued by D. Colling and co-workers at the Rodman Laboratory. In addition to this process variable, they further have reduced sulfur content significantly by inoculating the metal with a calcium-base alloy. Their work will be reported in the literature in the very near future.

Atmospheric Melting—The various types of melting furnaces available at the Rodman Laboratory include the basic-electric arc furnace shown in Fig. 1 and several acid and basic-induction furnaces, one of which is shown in Fig. 2.

The basic-electric steel melting investigations are being conducted in a 6½-ton basic-electric steel furnace which uses high-density scrap with average sulfur and phosphorus contents of 0.025 per cent. The procedure generally consists of 1) an oxidizing period, 2) a wash period, and 3) a reducing period. This melting practice (see accompanying description) first produced cast steels with average phosphorus and sulfur contents of 0.010 per cent. Subsequent investigations have refined the process to produce steel castings with a reduced sulfur content of 0.005 per cent while the phosphorus content remains at the 0.010 per cent level.

The desulfurizing studies carried out by Dunn and Colling have centered around a 500-lb basic-induction furnace. Their general practice was the standard procedure (see accompanying description) followed by increased deoxidation and inoculation techniques. This melting practice produces cast steels with an average phosphorus content of 0.015 per cent max and sulfur contents as low as 0.002 per cent.

Vacuum Melting — The 500-lb basic-induction furnace illustrated in

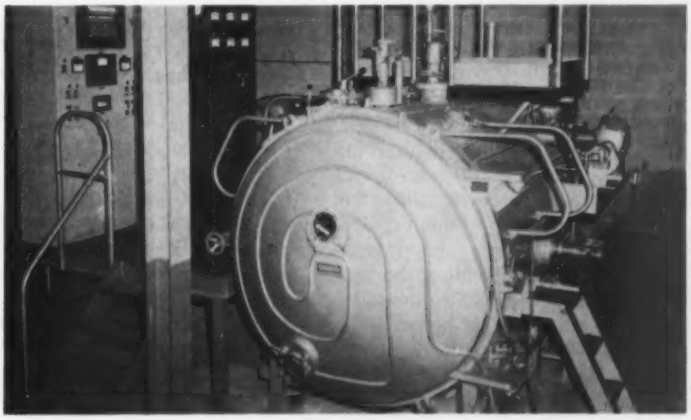
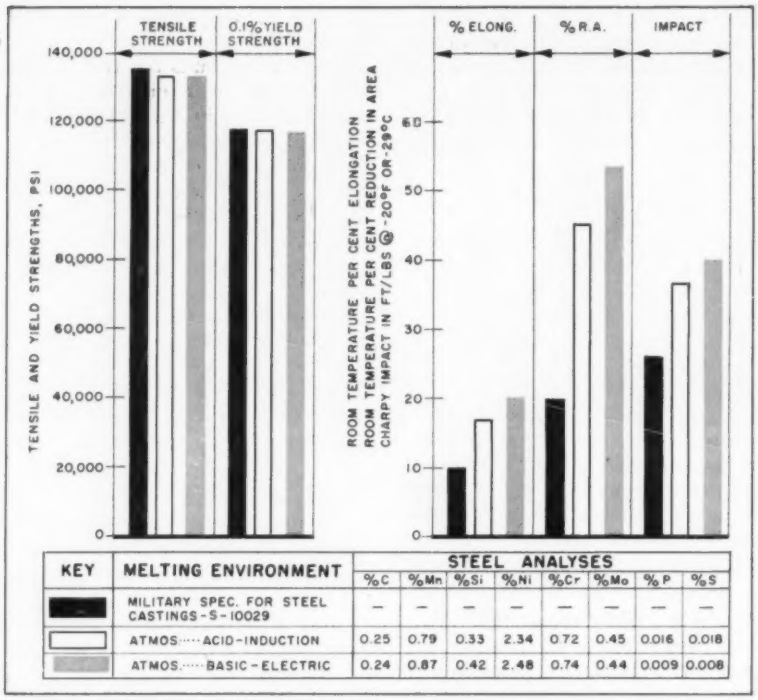


Fig. 3—Basic-induction furnace used to study the effect of low pressure melting and casting environments on chemical and physical properties of cast steels

Fig. 4—Effect of phosphorus and sulfur on physical properties of high nickel 4325 steel castings



KEY	MELTING ENVIRONMENT	STEEL ANALYSES %C	%Mn	%Si	%Ni	%Cr	%Mo	%P	%S
	MILITARY SPEC. FOR STEEL CASTINGS - S - 10029	—	—	—	—	—	—	—	—
	ATMOS.····ACID-INDUCTION	0.25	0.79	0.33	2.34	0.72	0.45	0.016	0.018
	ATMOS.····BASIC-ELECTRIC	0.24	0.87	0.42	2.48	0.74	0.44	0.009	0.008

Fig. 3 is being used to study the effect of low pressure melting and casting environments on chemical and physical properties of cast steels. The melting practice used is similar to the atmospheric basic induction melting practice, except that volatile metals are not added until the end of the melting cycle. This equipment is capable of melting and casting at an absolute pressure of 1 micron (approximately 1 millionth of an atmosphere), which is attained within 16 minutes after turning on the pumps in the vacuum chamber (initially at atmospheric pressure).

These recent advances in steel melting practices at Watertown Arsenal have produced significant improvements in the ductility and toughness of cast low-alloy steels while constant strength levels are maintained.

Fig. 4 illustrates the effect of phosphorus and sulfur contents on the physical properties of several high-nickel 4325 steel castings produced by acid-induction and basic-electric air melting processes subjected to the same heat treatments and physically tested in accordance with Military Specification MIL-S-10029.

Comparison of these mechanical properties with the minimum Ordnance requirements for these castings at the same strength level (132,000 psi) shows that the acid-induction cast steel containing 0.016 per cent phosphorus and 0.018 per cent sulfur exhibits elongation, reduction-in-area, and impact properties 71.0, 126.5, and 41.5 per cent greater, respectively. The basic electric cast steel containing 0.008 per cent phosphorus and 0.009 per cent sulfur shows further increases in the same physical properties of 93.0, 164.5, and 51.5 per cent, respectively.

Exceed Requirements—Thus, both melting practices produced 4325 steel castings with ductility and toughness far above minimum Ordnance requirements. The basic-electric castings containing the least phosphorus and sulfur contents exhibit the best physical properties at this 132,000-psi tensile strength level.

Fig. 5 illustrates the effect of phosphorus and sulfur contents on the physical properties of several 4330 steel castings produced by acid-induction and basic-electric air melting processes, subjected to the same heat treatments and physically tested in accordance with Military Specification MIL-S-10029.

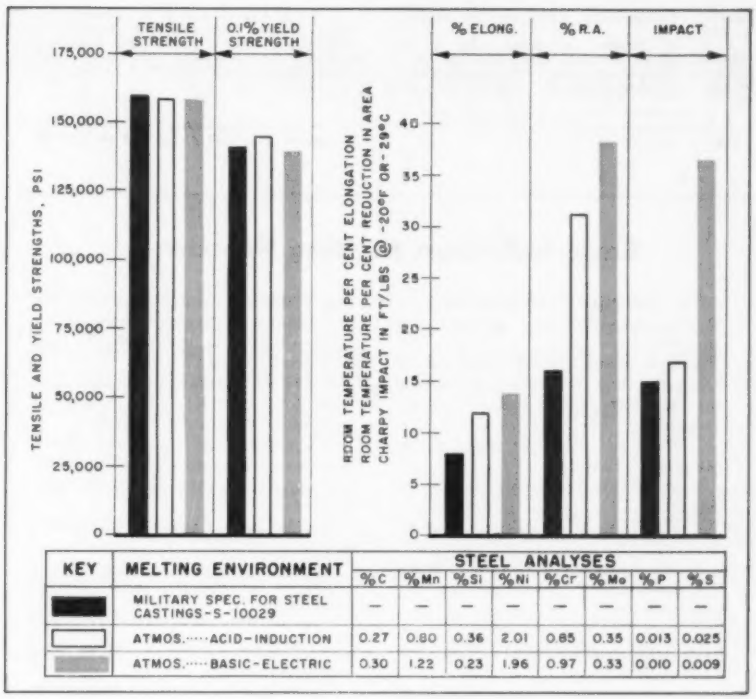
Comparison of these mechanical properties with the minimum Ordnance requirements for these castings at the same strength level (157,000 psi) shows that the acid-induction cast steel having 0.013 per cent phosphorus and 0.025 per cent sulfur exhibits elongation, reduction-in-area, and impact properties 51.3, 95.0, and 12.0 per cent greater respectively, whereas the basic-electric cast steel having 0.010 per cent phosphorus and 0.009 per cent sulfur shows further increases in the same physical properties of 70.0, 137.5, and 142.7 per cent, respectively.

Both melting practices thus yielded 4330 steel castings with physical properties far superior to the minimum Ordnance requirements, and again the reduced phosphorus and sulfur basic-electric castings exhibited the best ductility and toughness at this 157,000-psi tensile strength level.

The superior ductility and toughness exhibited by the 4325 and 4330 steel castings with reduced phosphorus and sulfur contents stimulated additional investigations of air melting practices in both the basic-electric and basic-induction furnaces, concentrated primarily on further desulfurization of high-strength 4340 steels.

Initial results in the current basic-electric studies show that a sulfur level of 0.005 per cent has been attained thus far, whereas Dunn and Colling continually have reduced the sulfur level of their basic-induction cast steel to 0.002 per cent. Both practices employ 1) a highly basic slag, 2) a thoroughly deoxidized steel bath, and 3) inoculation of the metal with a calcium-base alloy. All of the results will be reported in the literature in the very near future.

Vacuum Melting—In addition to the progress made thus far with the air melting practices, preliminary chemical and physical characteristics of the vacuum induction cast steels indicate a great deal of promise for further improvement of the ductility and toughness of high-strength steel castings. The asset that vacuum melting can contribute



KEY	MELTING ENVIRONMENT	STEEL ANALYSES							
		%C	%Mn	%Si	%Ni	%Cr	%Mo	%P	%S
	MILITARY SPEC. FOR STEEL CASTINGS-S-10029	—	—	—	—	—	—	—	—
	ATMOS.·····ACID-INDUCTION	0.27	0.80	0.36	2.01	0.85	0.35	0.013	0.025
	ATMOS.·····BASIC-ELECTRIC	0.30	1.22	0.23	1.96	0.97	0.33	0.010	0.009

Fig. 5—Effect of phosphorus and sulfur content on the physical properties of 4340 steel castings

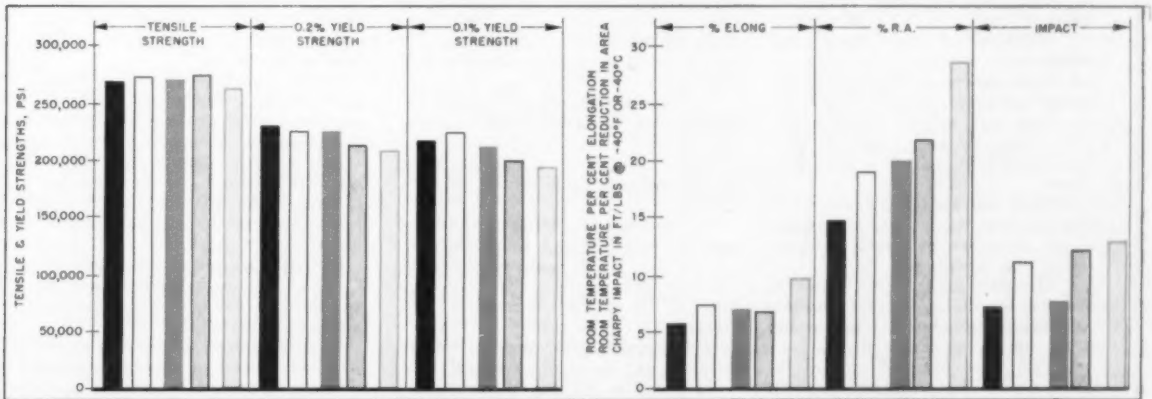
to the steel casting industry is environmental control of melting and casting conditions—that is, 1) humidity = a constant, 2) absolute pressure of the environment = a constant, and 3) concentrations of gases such as hydrogen, oxygen, and nitrogen are minimized and removed from the liquid steel.

All of these factors will aid the operating metallurgist in predicting reproducibly the exact physical and chemical properties of cast steel components with a minimum percentage of rejected castings in any production process.

The progress achieved thus far in improving the ductility and toughness of high-strength steel castings through the use of the various Rodman Laboratory melting pratices is summarized in Fig. 6. A comparison of the physical properties of five 4340 type steel castings processed in basic-induction and basic-electric air melting furnaces shows that while a constant high-tensile-strength level of 270,000 psi is retained, steady improvement in physical properties results with phosphorus and sulfur removal, and maximum ductility and toughness are achieved through vacuum melted and cast steels.

Comparison of the basic-induction, air melted steel casting containing 0.017 per cent phosphorus and 0.022 per cent sulfur with the basic-induction, vacuum melted cast steel containing 0.010 per cent phosphorus and 0.014 per cent sulfur shows significant increases in elongation, reduction-in-area, and impact properties of 66.7, 91.3, and 76.0 per cent, respectively, while a rela-

Fig. 6—Effect of melting environment and phosphorus and sulfur contents on the ductility and toughness of high strength steel castings



KEY	MELTING ENVIRONMENT	STEEL ANALYSES								HEAT TREATMENT						
		%C	%Mn	%Si	%Ni	%Cr	%Mo	%P	%S	AUSTENITIZE	FURN. COOL TO	QUENCH	TEMPER	QUENCH	TEMPER	QUENCH
	ATMOS·····BASIC-INDUCTION	0.37	1.46	1.64	1.30		0.31	0.017	0.022	1600°F - 4 HRS	1325°F - 2 HRS	WATER	600°F-16 HRS	WATER	600°F-16 HRS	WATER
	ATMOS·····BASIC-ELECTRIC	0.39	0.85	1.56	2.07	0.79	0.33	0.012	0.005	1600°F - 3 HRS	1375°F - 2 HRS	OIL	600°F - 6 HRS	OIL	600°F - 6 HRS	AIR
	ATMOS·····BASIC-INDUCTION	0.36	0.68	1.16	1.78	0.99	0.24	0.008	0.002	1525°F - 1 HR	1400°F - 1 HR	OIL	400°F - 2 HRS	OIL	400°F - 2 HRS	OIL
	VACUUM·····BASIC-INDUCTION	0.40	1.22	0.32	1.86	0.87	0.25	0.014	0.022	1600°F - 5 HRS	1400°F - 2 HRS	WATER	400°F - 7 HRS	WATER	400°F - 7 HRS	WATER
	VACUUM·····BASIC-INDUCTION	0.38	0.82	0.39	1.83	0.87	0.25	0.010	0.014	1600°F - 5 HRS	1400°F - 2 HRS	WATER	400°F - 7 HRS	WATER	400°F - 7 HRS	WATER

tively constant high tensile strength level is maintained.

Conclusions—The work completed and the work currently under way at Rodman Laboratory have 1) clarified the necessity of minimizing phosphorus and sulfur contents in cast low-alloy steels to maximize ductility and toughnes at low, medium, and high-strength levels and 2) has indicated that a further significant improvement in ductility and toughness of these cast steels may result through the use of vacuum melting and casting techniques.

REFERENCES

1. M. C. Flemings, R. Green, and H. F. Taylor, "Structural Variables Influencing Mechanical Properties of High Strength Cast Steels," *Modern Castings*, October, 1959, pp. 84-98.
2. J. Zotos, "Effect of Phosphorus and Sulfur Content on Ductility and Toughness of Cast Low Alloy Steels," *Electric Furnace Steel Proceedings*, AIME, Vol. 16 (1958), pp. 274-283.
3. J. Zotos, "Factors Affecting Dephosphorizing and Desulphurization in Basic-Electric Steel Production," presented at AIME International Symposium on the Physical Chemistry of Process Metallurgy, Pittsburgh, April, 1959.
4. J. Zotos, "The Significance of Reduced Phosphorus and Sulphur Content on the Ductility and Toughness of Cast Low Alloy Steels," *Transactions*, AFS, Vol. 67 (1959), p. 698.
5. K. D. Holmes, J. Zotos, and P. J. Ahearn, "High Strength Steel Castings, Mechanical Properties and Processing Techniques," *Modern Castings*, July, 1959, pp. 65-70.
6. J. Chipman, lecture notes from Course 3.21 (Thermodynamics of Steelmaking), Massachusetts Institute of Technology.
7. P. J. Ahearn and J. L. Belser, "Watertown Arsenal Manufacturing Techniques for Gun Tubes, Breech Rings, and Ferrous Sand Castings for the Period 1950-1954 Inclusive," *Technical Bulletin*, No. WPL-1, April, 1954.

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Basic-Induction Melting Practice [7]

The operating procedure for producing basic-induction cast steel was as follows:

1. The charge, which consisted of scrap, bar stock, and nickel, was loaded into the furnace and meltdown commenced.
2. Extra bar stock was added as the melting proceeded.
3. At complete meltdown, FeMo was added.
4. Pig iron was added (3-minute boil).
5. FeCr was added (2-minute boil).
6. Power was turned off and the slag removed.
7. Power was turned on, FeMn and FeSi additions were made, and the molten steel was heated to the tapping temperature.
8. The metal test specimen was then taken for a complete analysis and the heat was tapped into the ladle.
9. One-tenth of 1 per cent aluminum was added to the ladle during the tapping operation to assure maximum deoxidation.
10. The various steels produced were cast into Ordnance components.
11. The castings were processed and evaluated for chemical and physical properties.

Basic-Electric Melting Practice [4]

The operating procedure established for producing high quality low sulfur and phosphorus basic-electric cast steel was as follows:

1. The charge consisted of 12,000 lb of scrap, 400 lb of limestone, and 50 lb of calcined coke (amount of coke varied according to per cent carbon in the scrap; a meltdown carbon of approximately 0.8 per cent was desired). The limestone and coke were loaded into the furnace after the bottom had been lined with a thin layer of scrap, then remaining scrap was added.
2. Meltdown of the charge was initiated.
3. A 20-minute waiting period followed meltdown. During this time the bath was rabbled several times with a steel skimmer, and bath temperature of 2850 to 2950° F was maintained.
4. Metal test specimen A was taken and analyzed for carbon, manganese, silicon, chromium, molybdenum, nickel, sulfur, and phosphorus.
5. Oxidation began with a controlled addition of 480 lb of dry iron ore and 200 lb of limestone, premixed and added over a 45-minute period.
6. One hour after the start of the ore addition, slag (meltdown slag plus oxidizing slag) was removed through the slag door steel skimmers. During this period, the phosphorus in the steel oxidized and reacted with the slag to produce calcium phosphate, which was removed during the de-slagging operation.
7. After the first slag-off, metal test specimen B was taken for carbon, sulfur, and phosphorus analyses.
8. The wash slag, which consisted of 180 lb of limestone and 42 lb of dry fluorspar was added to the clean steel bath. This slag absorbed any excess phosphates remaining after the oxidizing slag had been removed and minimized the possibility of phosphorus reverting back into the molten steel.
9. Thirty minutes later the wash slag was removed. The steel bath was rabbled several times during the wash period to intermix the slag and metal.
10. After the second slag-off, the reducing slag was added in the following sequence:

a. 90 lb of ferrosilicon, 60 lb of ferromanganese, and 10 lb of carborite.

b. On complete solution of the components added in (a.) above, the premixed slag, which consisted of 360 lb of limestone, 60 lb of dry fluorspar, and 15 lb of fine ferrosilicon, was added.

c. When this slag became molten, a total of 30 lb of powdered coke was added to the slag at various intervals and mixed with the slag by rabbling the bath. This coke aided in the formation of calcium carbide for favorable desulfurization.

d. Varying amounts of limestone, fluorspar, ferrosilicon, and coke were added at intervals to shape up the slag properly. The bath was rabbled several times, and its temperature was maintained between 2900 and 2950° F. During this period, sulfur in the steel reacted with the slag to produce calcium sulfide, which remained in the slag if a high basicity was maintained.

11. After the reducing slag had shaped up, metal test specimen C was taken for a complete analysis (same as Step 4).
12. On receipt of the analysis of metal test specimen C, the appropriate nickel, chromium, molybdenum, and carbon additions were made in the form of ferroalloys.
13. On complete solution of these alloy additions, the power input was raised to bring the bath up to the desired pouring temperature.
14. Ferroalloy additions of manganese and silicon based on metal test C were made, and the molten steel was heated to the tapping temperature.
15. The final metal test specimen, D, was taken for a complete analysis and the heat was tapped into the bottom-pour ladle.
16. One-tenth of 1 per cent aluminum was added to the ladle during the tapping operation to assure maximum deoxidation.
17. The various steels produced were cast into Ordnance components.
18. The castings were processed and evaluated for chemical and physical properties.

Questions and Answers

Gas condition indicated by small holes which appear after grinding surface . . . Fumes blow back into foundry . . . Briquetting cast iron borings . . . Conductivity is needed . . . Metal flow in step gating

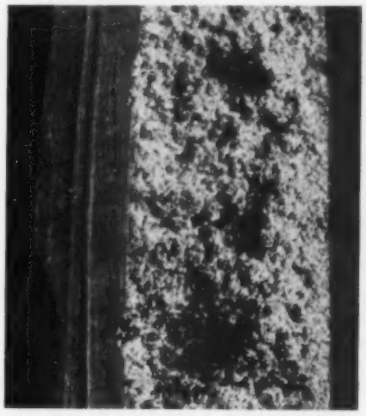
Brass Casting Shows Pinholes

We are sending a piece of red brass (85-5-5-5) which was cut from the end of a 63-lb pump casting. You will note it has numerous pinholes on the ground surfaces. This is becoming quite a problem since the molder making the casting with the same practice will have a good one and the next one will show the defect. The casting was made in green sand, No. 1 Albany, 5½ per cent moisture, 15 to 20 permeability, and rammed between 55 and 60 psi. Pouring temperature was 2150° F, and the metal was deoxidized with 2 oz per 100 lb with 15 per cent phosphor-copper. Cores were made of 50 grain fineness lake sand coated with mica wash, and were soft and open.

After breaking the section of the casting forwarded to us and studying the fractured surfaces, we believe that the primary difficulty is gassy metal, with possibly pouring temperature on the high side, and need for some improvement in the gating system as secondary factors.

That gassy metal is the main problem is borne out by your statement that with the same molder and molding practice a good casting is produced one time and bad the next. Also it is more than likely that if the problem is caused by mold or core conditions, the evidence would show up on the as-cast surface without need of grinding or machining operations.

We suggest you give close attention to your melting practice to see that conditions receptive to gas pickup are held to the minimum. This means that the furnace atmosphere should be slightly on the oxidizing side—a condition best determined by use of gas-analysis equipment although a rough approximation can be made by inserting a cold piece of clean zinc slab in the burner flame for a few seconds. If soot is deposited, the flame is reducing; if the zinc remains clean, it is neutral, and if a yellowish deposit forms, the flame is distinctly oxidizing, perhaps too much so.



Fracture shows gassy condition

Metal should be melted as quickly as possible since the longer it is at elevated temperature, the greater the gas pickup. Metal temperature should not exceed more than 100° F above the established pouring temperature range because the higher the temperature, the greater the gas pickup. Also the metal should be removed from the furnace and poured as soon as it reaches the desired temperature. Oily chips or scrap should not be used; burn off the oil or grease with a torch.

Earlier we mentioned the possibility of pouring temperature and gating being secondary causes. Usual pouring range of 85-5-5-5 alloy is indicated as 1950 to 2250° F, or somewhat higher for thin sections. Although we do not know the section thickness of the body of casting, we suspect from the flange that it is not less than ½ in. thick. Hence, we suggest you try reducing the pouring temperature about 50° or to 2100° F.

With regard to gating, the fracture shows evidence of a shrinky condition which usually is associated with insufficient feeding. There appears to be ample proof, however, that presence of gassy metal interferes with the feeding process, and the shrinky condition may be due to that condition rather than to the gating. We suggest that you run the metal from the sprue into adequate risers placed close to the heavy sections, and thence into the casting cavity.

Has Ventilation Problem

Because of trouble with fumes evolved during melting in our crucible furnaces we installed a canopy over them to aid in ventilation. Canopy is 4 x 8 ft and tapered into a 12-in.-diam exhaust pipe. The arrangement does not operate satisfactorily, however, since often a back draft is encountered which blows fumes all over the foundry. Can you suggest a solution which will not involve a major change?

Satisfactory solution of your problem requires certain information such as height of the canopy above the floor, whether it is enclosed in any manner, height of the exhaust stack or pipe, temperature of the gases entering the stack, etc. This information is needed to determine the available pressure for gravity venting, volume of air and gases to be vented, etc. We suspect, however, that your trouble may be that the outlet stack is not large enough, or that it is not high enough above surrounding structures.

The latter seems to be indicated by your reference to a backdraft which blows the fumes into the foundry. That condition usually exists when wind currents sweep up over higher structures and descend on the other side. Hence, if the stack is lower than structures in the nearby vicinity, we suggest that you extend it appreciably above them.

Other procedures include reducing the amount of air and gases to be exhausted by enclosing the canopy on at least three sides, and preferably four. Sliding panels would permit access to the furnaces, or the canopy enclosure could be arranged so that it could be moved up and down.

If that does not help you will have to install an exhaust fan in the stack, and possibly you may have to increase the diameter of the pipe. A temporary method would be to inject compressed air into the stack pipe with a nozzle directed upward, but that is an expensive way of creating additional draft in the stack.

Step Gating Poses Problem

In a recent meeting it was pointed out that in stair step gating, only the bottom ingate in the system feeds the casting. Is that statement true?

Studies by a number of investigators have established that in the commonly practiced method of step gating as shown at *A* in the accompanying illustration, the bottom gate is the only one that does any feeding, and as the metal rises in the casting to the upper gates, the metal flows back into them. This illustration from the article "Gating Factors" by Johnson, Bishop, and Pellini from the April, 1954, issue of FOUNDRY shows several variations of step gating and the typical flow patterns obtained.

In *B*, using a tapered sprue, all gates feed as soon as the sprue becomes filled; in *C* with offset sprue and gates, the top and bottom gates feed as soon as the sprue is filled. The only successful method of step gating which fills from successive gates as the casting is filled is by employing a reversed sprue system as indicated at the right in the illustration. In that system, the down sprue into which the metal is poured opens into a second or branch sprue. That sprue is tapered, with the bottom being larger than the top.

Wants Higher Conductivity

We are making some copper castings for conductivity work, using a combination of 97 per cent copper and 3 per cent zinc. Conductivity of the alloy is 75 to 85 per cent, which is satisfactory to the customer, but we are interested in obtaining higher conductivity. Can you suggest other additions than zinc which will result in sound castings with high conductivity?

Sound copper castings with high conductivity may be obtained by suitable degasification and deoxidation practices. One method is by addition of calcium boride in the amount of 2 oz per 100 lb of molten copper. Another method is to add 0.02 per cent metallic lithium per 100 lb.

Those materials are available in sealed copper tubes containing definite amounts of the material so that weighing is not necessary. For effective results the additions must be plunged beneath the surface of the molten copper and held there until reaction is complete.

With use of either material it is advisable to pour a test plug about 3 in. long and 1½ in. in diam, and observe whether or not the top of the plug shrinks down or pipes. If it does not, a second addition is made and another test poured. Suitably degasified and deoxidized copper as well as its alloys show a definite shrink in the test plug.

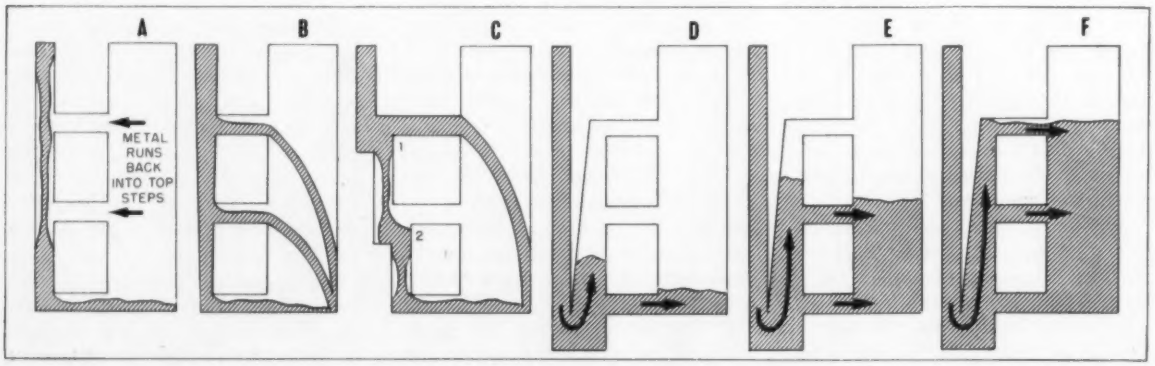
Wants To Briquet Borings

In our foundry in Puerto Rico we intend to experiment with the briqueting of cast iron borings, using a small hydraulic press and bonding the borings with 10 per cent portland cement. However, we wonder if some other binder would be more appropriate. Someone suggested we might use molasses which is plentiful here.

Cast iron and steel briquets made from borings and chopped turnings are made in this country without use of any binder on hydraulically operated presses at pressures of about 25 tons per sq in. Densities of the briquets are said to be 78 per cent that of solid iron for cast iron type and around 65 per cent of solid steel in the case of steel briquets.

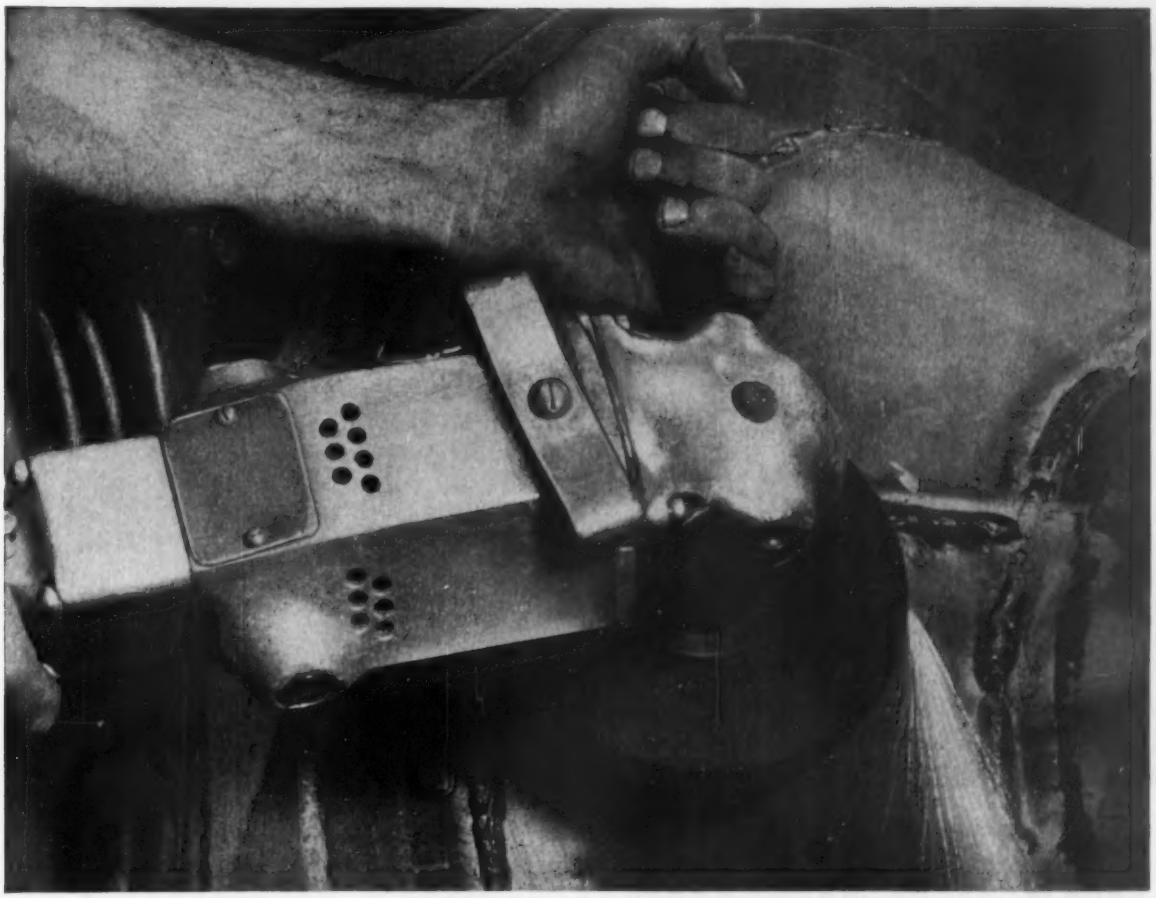
We have seen references to foundries making briquets by using portland cement as the binder in about the same amount as you mention, but they were made in forms or molds of the desired size, and hand tamped or rammed. The briquets were air dried prior to use.

We doubt that molasses could be used.



Metal flow in common step gating systems shown in A, B and C, and that for reversed sprue system in D, E and F

FLEXLITE RAISED HUB GRINDING WHEELS



Safety guard removed to illustrate full view of Flexlite Grinding Wheel

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U.S. Flexlite Raised Hub Wheels are built for the utmost safety—their manufacture is controlled by unerring electronics. Layers of fiber glass reinforce the wheel. These wheels give you a cost-saving advantage right from the start.

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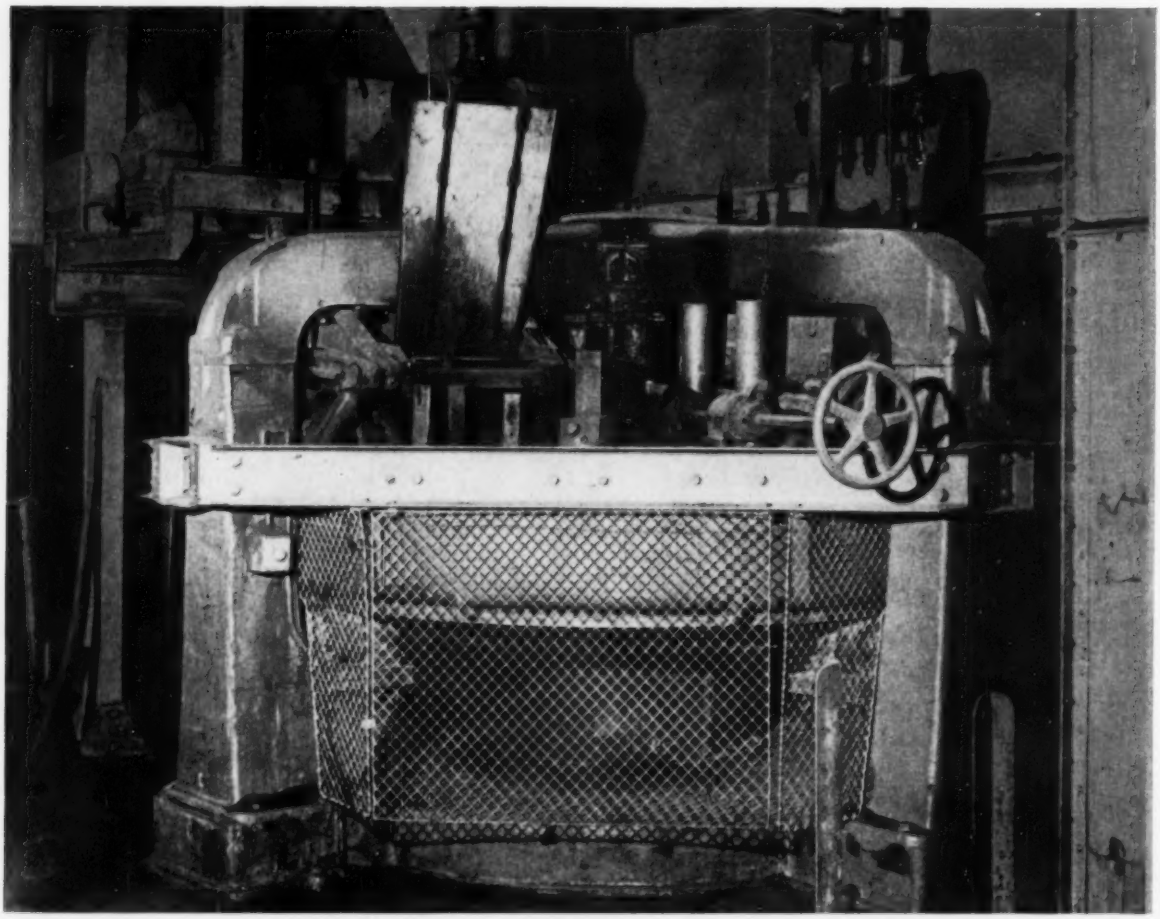

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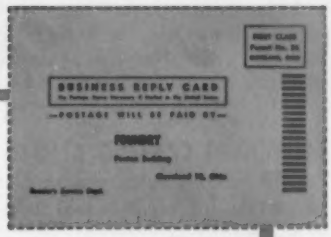
Circle 617 on Page 53

For More Information
Use Reply Card—Page 53



What's New in Equipment and Supplies

FIRE EXTINGUISHERS

Pressurized dry chemical portable extinguishers in 2½, 5, 20, and 30-lb sizes and 2½-gal pressurized water and loaded stream extinguishers feature simplified operation and design. Line also includes 200 and 400-lb dry chemical hose rack unit. The large extinguishers, mounted on a wall, floor, or truck, are for use on severe electrical, LP gas, or inflammable liquid fires. — **Walter Kidde & Co. Inc.**, 675 Main St., Belleville 9, N. J.

For More Details Circle No. 402—Page 53

OVERHEAD AIR HOISTS

Lightweight, heavy duty, overhead air hoists are available in both piston and rotary motor models. The rotary hoists, 86R-10 and 86R-20, have capacities of 1000 and 2000 lb and lift at rates of 40 and 20 fpm, respectively. Parts of the rotary motor hoists are interchangeable with the piston motor hoists, reducing necessary stock inventory. Piston hoists are more suited for use in corrosive atmospheres. Standard equipment includes safety suspension and safety load hooks; roller chain or link chain for 8 ft of lift; rope control; swivel air inlet; air strainer; and safety stops.—**Gardner-Denver Co.**, 1011 S. Front St., Quincy, Ill.

For More Details Circle No. 403—Page 53

AIR VIBRATORS

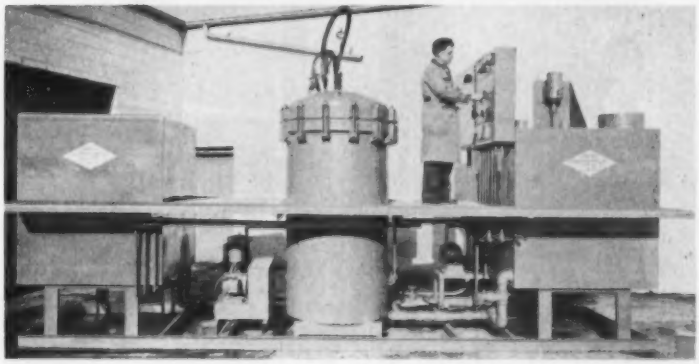
Flask-Rapper air vibrators can be used for rapid shakeout cleaning of flasks and pots, as well as for general knockout work. Vibrator features one-piece construction. Piston is the only moving part. Units are designed for low air consumption and operate on 35 to 65 psi. Model FR-3 weighs 74 lb and has a 3-in. piston. Model FR-4 weighs 115 lb and has a 4-in. piston.—**National Air Vibrator Co.**, 435 Literary Rd., Cleveland 13, Ohio.

For More Details Circle No. 404—Page 53

ALUMINUM REFRACTORY MIX

Tabular aluminum refractory material, Pli-Tab Trowl-Mix, can be used as a lining in catalyst collector cyclones, pickup points, elbows, valve bodies, transfer lines, etc. It can be made stiff enough to pound or ram. Only a water additive is required, and the material sets up in 2 to 4 hr and cures in 12 hr. Substance is said to have exceptional and uniform abrasion resistance at all temperatures up to 2000° F, to be chemically resistant, and to have a fusion point above Cone 38 (3335° F). Mix weighs 150 lb per cu ft in place

Impregnation Unit Has Central Controls



Batch-type casting impregnation machine features central station mounting of all controls at convenient operator height above the rugged steel grated platform. Electrical controls are in one panel section and hydraulic controls in another.

Unit has double ball-check, blow-back system designed to prevent inadvertent reversal of sealant flow during the blow-back cycle. Blow-back piping discharges within the holding tank below minimum sealant level to provide splashfree operation.

Machine is recommended for use with metal oxide type sealant materials and is designed for pit installation. A gear motor agitator in the sealant tank provides thorough agitation without introducing air into the sealing fluid. —**Prenco Mfg. Corp.**, 2605 W. 14 Mile Rd., Royal Oak, Mich.

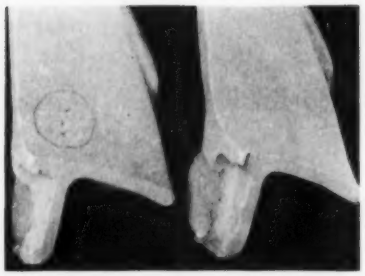
For More Details Circle No. 437—Page 53

and is available dry in 100-lb bags.—**Plibrico Co., Refractory Div.**, 1800 N. Kingsbury St., Chicago 14, Ill.

For More Details Circle No. 405—Page 53

ALUMINUM CASTING ALLOYS

PT (pressure-tight) grade of aluminum casting alloys is said to have reduced shrinkage tendencies. The metal is offered as an alternative to any of the standard aluminum sand and permanent mold casting alloys. Need for extra gates and risers is eliminated by use of this alloy. Substantial control possible with the alloy results in more uniform pressure-tight castings and the reduced surface shrinkage gives brighter, cleaner surfaces to castings. Process does not affect physical and mechanical properties, machinability, or heat treatment characteristics. Illustration shows typical sand casting on left, casting of PT grade ingot on right.—**American Smelting and Refining Co.**, 120 Broadway, New York 5, N. Y.



For More Details Circle No. 406—Page 53

FUEL CYLINDER BRACKETS

Sure-Lok mounting bracket for LPG fuel cylinders is made of high-strength steel, has adjustable toggle clamps, and is web lined for protection. A locating pin is provided for cylinder positioning. Mounting supports are available for every model of industrial machine. **Industrial Gastruck Inc.**, 2019 Dempster St., Evanston, Ill.

For More Details Circle No. 407—Page 53

SAFETY SHOES

Sportlite model safety shoe of the Honest Knight line is made of lightweight pigskin and combines steel toe protection with casual sport shoe styling. Specially designed foundation for the steel box has a channel

in which the edges of the box ride to prevent spreading under impact and to prevent the box from cutting into the sole. The shoes are durable, water repellent, and soil resistant and are available in gray and brown.—**Haus of Krause**, Safety Shoe Div., Rockford, Mich.

For More Details Circle No. 408—Page 53

PIERCED METAL SCREEN

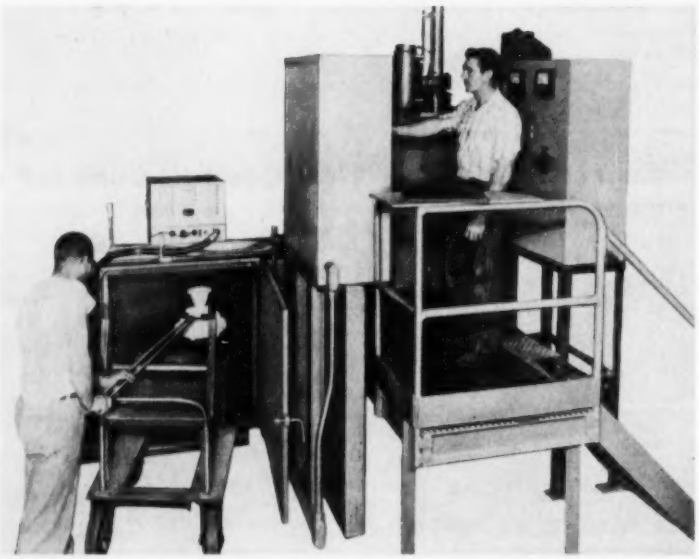
Conidure pierced metal sheet is said to lengthen screen life. Trapezoidal holes are pierced in sheets of carbon or stainless steel, copper, brass, or aluminum. Hole diameters range from 0.004 to 0.099 in. Sheet thicknesses are from 0.014 to 0.079 in. Working side is available in several degrees of smoothness, from unrolled to rolled flat with electrolytic polish. Smaller ends of the tapered holes are on working side, and humps guide material to the openings. Metal is available in sheets up to 31 in. wide or formed into sheared shapes, cones, segments, and cylinders.—**Cross Perforated Metals, National-Standard Co.**, Carbondale, Pa.

For More Details Circle No. 409—Page 53

LOADING RAMPS

Mobile loading ramps feature heavy-duty, all-grating surface. The open-grating ramp is designed to eliminate build-up of snow, ice,

Furnaces Melt and Pour in a Vacuum



Almost continuous vacuum melting and precision casting operations can be carried on in two versatile induction-heated vacuum melting furnaces. The larger model, with capacity of 50 to 100 lb, has a horizontal layout. Mold chamber, shown at the left above, is beside and in line with the melting chamber. The two chambers are connected by a lock.

Molds are pushed through the lock into the melting chamber to receive the pour, then withdrawn into the mold chamber without breaking the vacuum. Charging stock is introduced into the melting chamber through a separate port.

Mold chamber of the smaller furnace is below the melting chamber, and molds are raised vertically into place.—**F. J. Stokes Corp.**, 5500 Tabor Rd., Philadelphia 20, Pa.

For More Details Circle No. 438—Page 53

NOW... GAS-FIRED!

The NEW C&S "BLO-CORE" Automatic SHELL MACHINE

Keeps Quality and Production **HIGH**...

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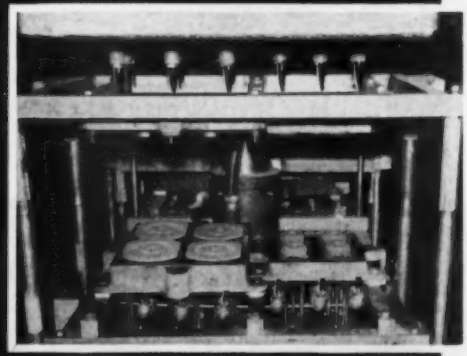

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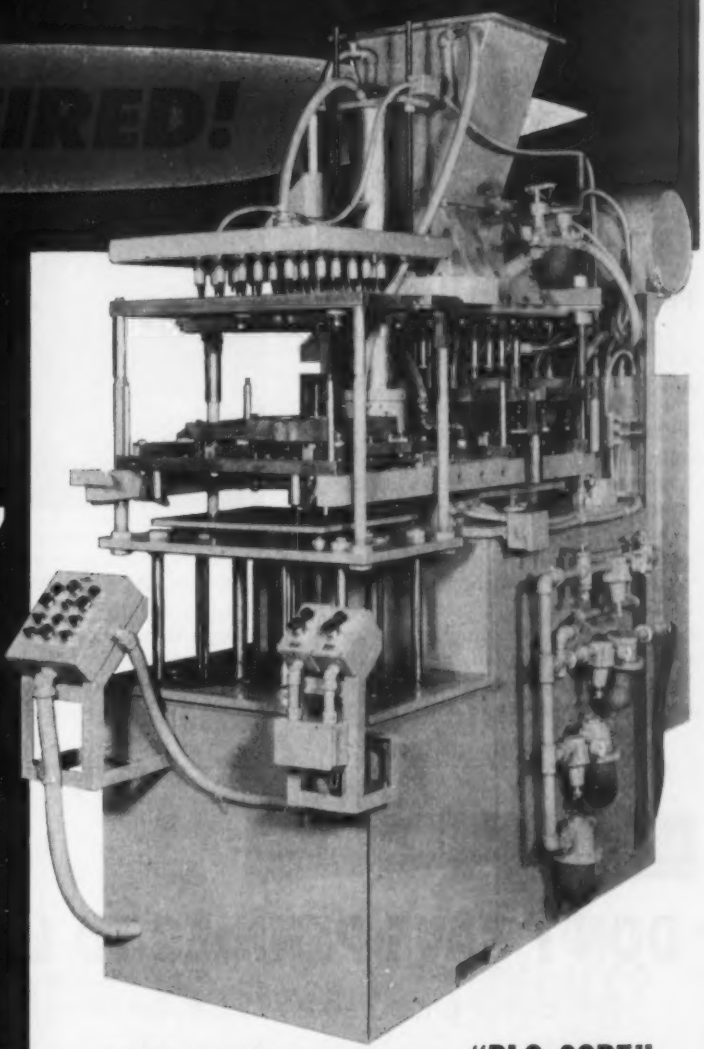

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Circle 618 on Page 53

mud, oil, or grease. Surface extends from curb to curb throughout entire length of traction area. Serrated tracks are set into the surface to provide positive wheel traction, and are available in varying tread widths. Ramps are of lightweight magnesium and come in two widths—58 and 70 in. Length is 30 or 36 ft.—**Magline Inc.**, 1900 Mercer St., Pinconning, Mich.

For More Details Circle No. 410—Page 53

PNEUMATIC BUNKER CUSHION

Clouth bunker cushion consists of a rubber diaphragm bolted to a reinforced steel base which includes both inlet port and exhaust valve. The cushions are designed to eliminate flow stoppages in bins and hoppers containing materials which tend to funnel, bridge, or cake. When inflated with recommended pressure of 45 psig, the cushion exerts a force of approximately 56,000 lb. This operation reportedly does not jeopardize personnel safety or cause damaging fatigue stresses. Unit has rubber shock cords connecting the membrane and exhaust valve to provide complete mechanical control.—**Tressler Engineering Products Div.**, 17 Battery Place, New York 4, N. Y.

For More Details Circle No. 411—Page 53

METAL SAMPLING DEVICE

Trepanning tool has been developed for taking pin samples from

solid material for chemical analysis. Device is basically a drill with a hollow bore which leaves a center core or pin standing after cutting into metal. Companion unit shears the pin at the base for simple, complete removal. The tool provides a pin sample with relatively low surface area to weight ratio and practically eliminates graphite loss.—**Laboratory Equipment Corp.**, St. Joseph, Mich.

For More Details Circle No. 412—Page 53

PLASTIC HATS AND CAPS

Injection molded, all-plastic hats and caps are individually dielectrically tested to meet E.E.I. Specification AP-1 1959. The Dielectric Hedgard hats and caps are lightweight and strong. Molded lugs on the brim permit the attachment of chin straps. A plastic snap-in suspension holds the hat securely and permits adjustment for head sizes 6½ to 7¾.—**Safety Equipment Div., Davis Emergency Equipment Co. Inc.**, 45 Halleck St., Newark 4, N. J.

For More Details Circle No. 413—Page 53

AUDIBLE WARNING SIGNAL

Audible signal is for use where coverage must be maintained over a considerable distance and for penetration of high-level noise areas. Vibrating diaphragm is driven by a contactless armature producing an audio output over 105 decibels at

EXECUTIVE REPORT #5

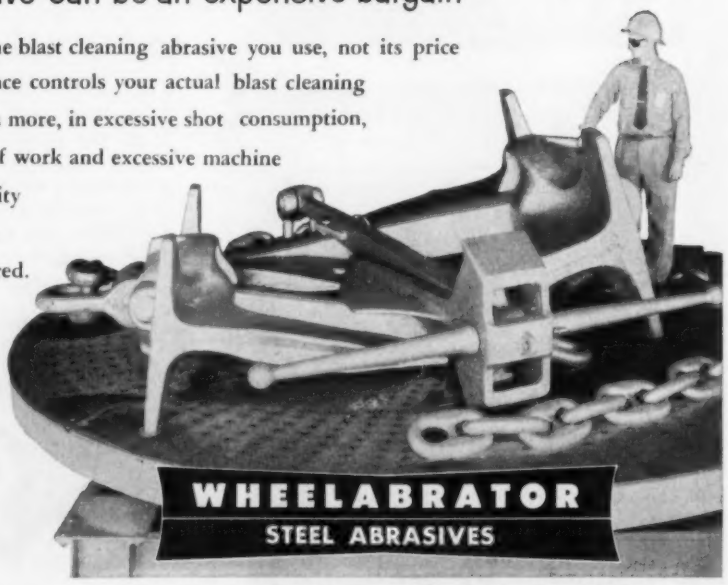
DON'T SAVE PENNIES TO LOSE DOLLARS

the lowest-priced abrasive can be an expensive bargain

Your real concern is the *ultimate cost* of the blast cleaning abrasive you use, not its price per ton. Abrasive quality and performance controls your actual blast cleaning costs. Lower priced abrasives can cost you more, in excessive shot consumption, lower production volume, poor quality of work and excessive machine maintenance. In case after case, high quality Wheelabrator Steel Shot has proven to be the *lowest-cost* abrasive, all factors considered.

You can prove the savings you'll make with Wheelabrator Steel Shot

Your Wheelabrator Abrasive Engineer will demonstrate the performance of Wheelabrator Steel Shot in your own plant. For details write to **Wheelabrator Corp., 505 S. Byrkit St., Mishawaka, Ind. In Canada, P.O. Box 490, Scarborough, Ontario.**

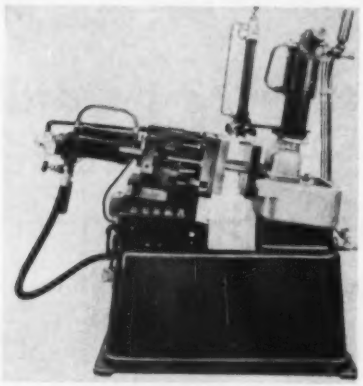


3 ft and operates on standard 60-cycle circuits. Unit is called Signal Horn PA-37100. — **Wheelock Signals**, Branchport Road, Long Branch, N. J.

For More Details Circle No. 414—Page 53

DIECASTING MACHINE

MAC 99 diecasting machine is pushbutton controlled with attach-



able electronic timer unit for single-cycle, automatic operation. Machine has four-way adjustable die unit and spacer plate. Dual microswitches replace the die overlock safety and a sensing device retracts the toggles if foreign matter enters the die faces.—**DCMT Sales Corp.**, division of British Industries Corp., Dept. K14, 80 Shore Rd., Port Washington, N. Y.

For More Details Circle No. 415—Page 53

HACKSAW BLADE

Improved metallurgical control of high-speed steel is said to give Silver Streak hand and power hacksaw blades improved efficiency and durability of the cutting edge. These blades are recommended for all production cutting which does not require tungsten blades.—**Atkins Saw Div., Borg-Warner Corp.**, 402 S. Illinois, Indianapolis, Ind.

For More Details Circle No. 416—Page 53

HEAVY-DUTY RAM

Gerlinger heavy-duty ram is designed for handling of extra-heavy, open-center loads such as castings. The unit is constructed of especially heavy steel plate. Ram can be installed on any lift truck.—**Towmotor Corp.**, 1226 E. 152nd St., Cleveland 10, Ohio.

For More Details Circle No. 417—Page 53

ELECTRIC HOISTS

Series S electric hoists feature one-piece gear housing and frame of heavy steel to eliminate misalign-

ment or oil leakage. Complete motor interchangeability permits the use of any standard NEMA D flange-mounted series 180 or 210 motor with integral disc brake.

EXECUTIVE REPORT #13

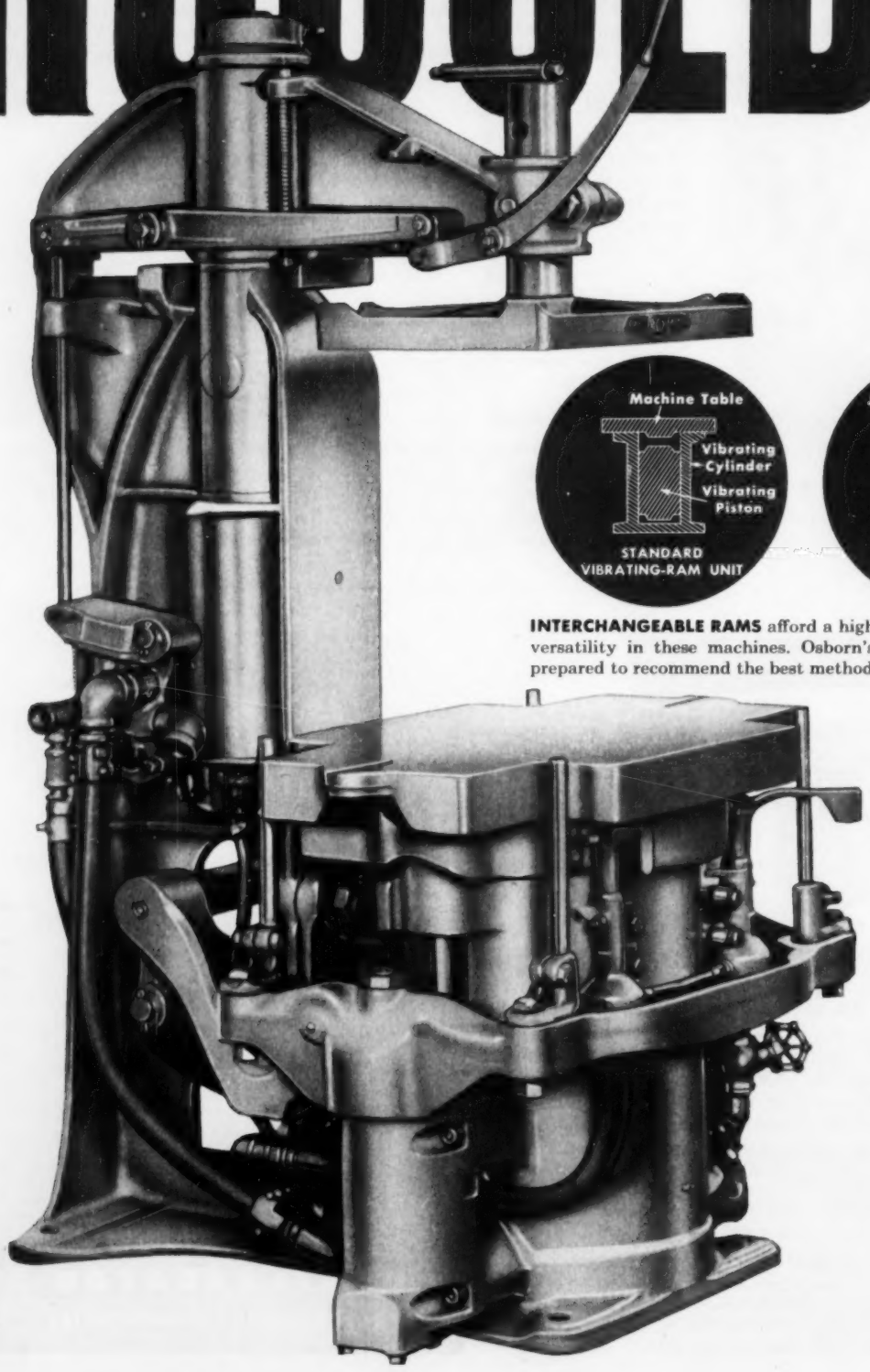
One blast machine can bridge this gap

Castings that are not best suited for cleaning in batch type blast mills, yet whose volume does not warrant installation of continuous, high speed equipment, can be blast cleaned with superior results in a Wheelabrator Spinner-Hanger Cabinet. These versatile cabinets can be designed to meet individual requirements of part size, number of compartments and blast wheels, and design of work-carrying fixture, offering efficiency and economy in cleaning limited runs of a wide variety of parts.

Spinner-Hanger Cabinets can answer your problem of rising operating costs.

Wheelabrator spinner-hanger cabinets clean "problem" parts as effectively as monorail cabinets, but at a fraction of the equipment cost. For specified cost-saving ideas, write to Wheelabrator Corporation, 505 S. Byrkit St., Mishawaka, Ind. In Canada, P. O. Box 490, Scarborough, Ont.

RUGGED...



INTERCHANGEABLE RAMS afford a high degree of production versatility in these machines. Osborn's Sales Engineers are prepared to recommend the best method for your work.

FOUNDRY EQUIPMENT MEMBER FEMA

FLEXIBLE

Vibrating Squeeze Stripper and Jolt Squeeze Stripper machines . . . engineered for dependable, precision molding performance by OSBORN

Designed and built around a single basic, dependable machine—today's complete line of Osborn Vibrating Squeeze Strippers and Jolt Squeeze Strippers gives the foundryman a choice of ruggedly-built units with the flexibility to handle a wide range of molding requirements.

In addition to the optional features shown below and the choice of vibrating-ram or jolt-ram actions—there are other important advantages in the line:

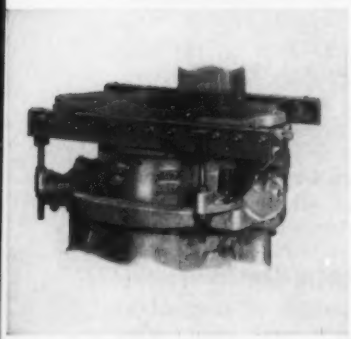
- Oil-controlled pattern draw with automatic acceleration from slow to fast . . . and automatic cushioning. Draw stroke is adjustable for any length of travel up to maximum—and for speed of slow draw. Pattern vibrator control can be set for required vibrating intervals—automatic synchro with the draw mechanism.
- Lifting pins adjustable for an extensive range of flask shapes and sizes . . . carried on cast draw frame. Equipment design demands that all draw mechanism parts function with uniform accuracy.
- Machines are available with squeeze cylinder diameters of 12″, 14″, 16″, 19″ and 21″ sizes.

In foundries throughout the country today—both types of all Osborn Squeeze Stripper models are on the job . . . producing at lower cost, higher-profit.

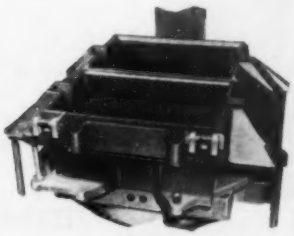
For full details on your applications—call in your Osborn Foundry Specialist to discuss your plans and problems soon. Write *The Osborn Manufacturing Company, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

WRITE FOR YOUR COPY . . . Folder No. 71-A gives complete specifications, operating data, applications and design features on the Osborn line of Vibrating Squeeze Stripper and Jolt Squeeze Stripper machines.

THESE OPTIONAL FEATURES FOR ALL MODELS . . . GIVE ADDED FLEXIBILITY

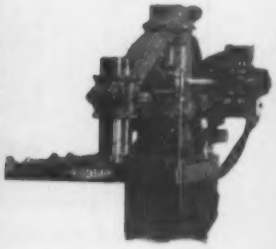


Roll-on, Roll-off Stripping rails



Cope and Drag Simultaneously

Single Push-Button Automatic Control Panel



Power-Operated Squeeze Head

leader in mechanization for the foundry

OSBORN®

MOLDING MACHINES • CORE BLOWERS • SHELL MOLDING MACHINES • BRUSHING MACHINES • INDUSTRIAL BRUSHES

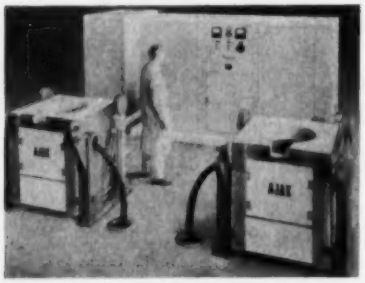
Circle 621 on Page 53

Hoists are available with lug or hook suspension, plain, hand rack, or motor driven trolley.—**Euclid Crane & Hoist Co.**, 4Chardon Road, Cleveland 17, Ohio.

For More Details Circle No. 418—Page 53

FREQUENCY CONVERTER

Multiductor static frequency converter is an economical, efficient



method of converting frequency for induction melting and heating purposes. Three-phase power at 60 cycles is taken directly from an ordinary supply line and delivered as single-phase power at 180 cycles. Output can be varied continuously and under load between zero and a maximum of 30 to 40 per cent over nominal rating.

Temperature control can be accurately maintained for either heating or melting applications. Melting charge can consist of cast iron borings, steel chips or turnings, and low cost scrap. Sizes range from 100 to 1000 kw. Units can be paralleled for large power requirements.—**Ajax Magnethermic Corp.**, P. O. Box 839, Youngstown 1, Ohio.

For More Details Circle No. 419—Page 53

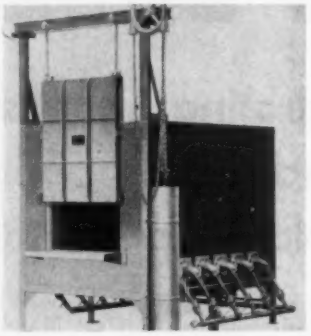
MACHINISTS' VISES

Machinists' vises made with guaranteed unbreakable malleable iron front jaw castings are available in seven sizes from 3 to 8-in. jaw widths. Other features include longer back jaw body, precision-machined nut and keyway to assure perfect alignment, and replaceable, hardened tool steel T-jaw faces. Working face has no screw heads or holes. Each vise is equipped with a graphite bronze thrust bearing to reduce friction, eliminate end play, and prevent wear. Both stationary and swivel base types are available. —**Columbian Vise & Mfg. Co.**, 9023 Bessemer Ave., Cleveland 4, Ohio.

For More Details Circle No. 420—Page 53

HEAT TREATING FURNACES

Thirty-inch series of Buzzer gas-fired heat treating furnaces features



massive chain-drive door for positive action, heat retention, and safe easy operation. Model No. 367236, illustrated, has inside working space 36 x 72 x 36 in. Furnace heats up to 2000° F with an hourly input of 1½ million Btu. Silicon carbide hearth provides high load strength and wear resistance. Insulating firebrick lining assures temperature uniformity, economy, and operator comfort. Six atmospheric venturi burners provide versatile heating capabilities. — **Charles A. Hones Inc.**, 2473 Grand Ave., Baldwin, L. I., N. Y.

For More Details Circle No. 421—Page 53

CASTING FILLER

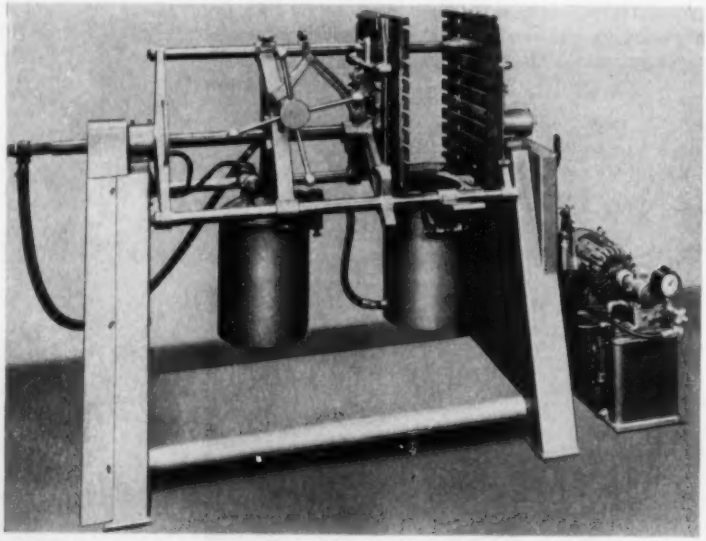
Copy-Cast is a two-component filler, sealer, bonding agent. The material can be used on the production or assembly line to repair casting and sheet metal rejects. Filler is said to feature excellent adhesive ability and dimensional stability.—**Future Chemicals**, 3008 W. Montrose Ave., Chicago 18, Ill.

For More Details Circle No. 422—Page 53

TESTING MACHINE

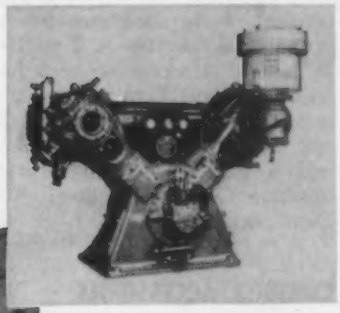
Testing machine is designed to perform tensile and compression strength tests within relatively low load capabilities. Model LPT features interchangeable load cells—100 to 1000 lb—each providing a different maximum load with gages and graduations to match. The 115-v electric motor-powered, hydrauli-

Shell Core Machine Is Hydraulically Powered

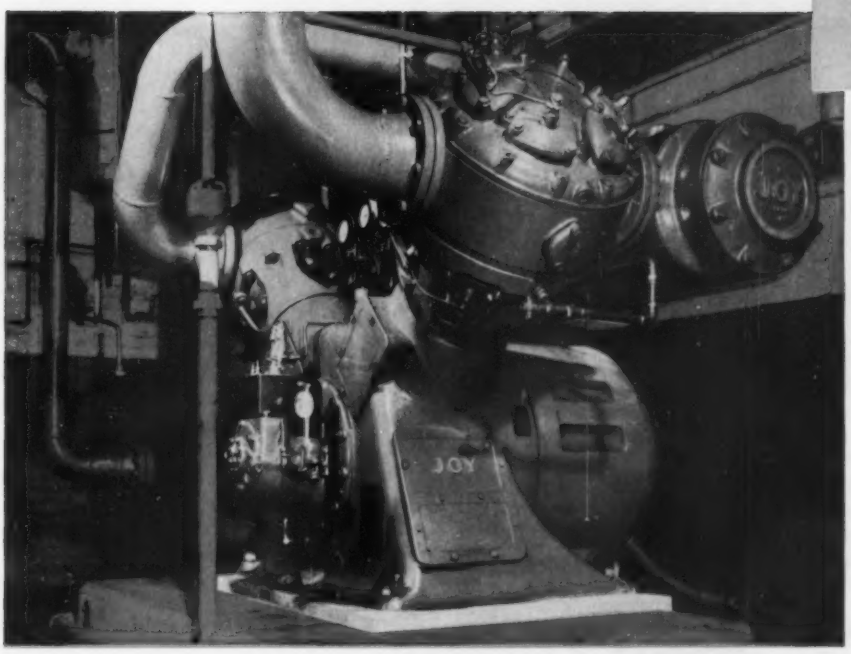


Model 400 shell core machine is hydraulically powered for fast, semiautomatic production of large shell cores. Unit has a sectional-type manifold and will produce many cores of various lengths in less than a minute production cycle. Face plates are wide and T-slotted to allow coreboxes to be changed easily with minimum shutdown. The hydraulic power unit can be placed beside or away from the machine and features an adjustable speed mechanism. —**Dependable Shell Core Machines Inc.**, 1634 E. Seventh Ave., Portland 14, Oreg.

For More Details Circle No. 439—Page 53



Compact design means simple installation. Set up on a simple block foundation, bolt down and connect air and water lines.

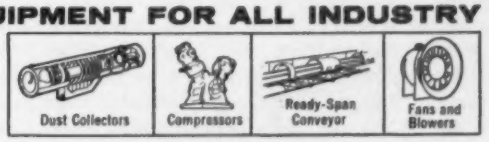


the COMPACT compressor with big compressor features... Joy WN-112

Only the package designed WN-112 has such heavy-duty features as replaceable cylinder liners and crosshead guides. These liners are made of special alloys which make possible fine machining and mirror-like polishing. The crosshead has no wedges, set screws or shims—never requires adjustment. The main bearings never need adjustment either because they are anti-friction, heavy duty ball, or spherical roller type. These, and other big compressor features add up to trouble-free performance that has made friends of literally thousands of plant and power engineers throughout industry.

When you are expanding your operations and require more compressed air, make sure you have details and complete information on the WN-112, one of a complete line of compressors for industry. You can then select any one of 24 standard models of the WN-112 plus special models for high and low pressures as well as oil-free operation. Capacities from 480 to 1072 cfm. Write for bulletin 340-13.

AIR MOVING EQUIPMENT FOR ALL INDUSTRY



JOY

Joy Manufacturing Company
Oliver Building, Pittsburgh 22, Pa.

In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario

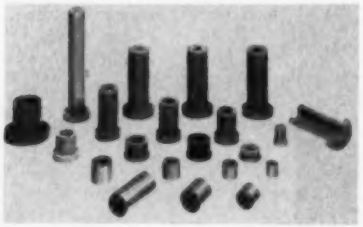
Circle 622 on Page 53

cally operating mechanism is independent of the load measurement system and operates at 0 to 1000 lb per sec. Machine accommodates tensile test specimens up to 1 x 12 x 3/16 in. thick and compression test specimens up to 4 in. in diam and 6 in. high.—**Detroit Testing Machine Co.**, 9390 Grinnell Ave., Detroit 13, Mich.

For More Details Circle No. 423—Page 53

COREBOX ACCESSORIES

Blow tubes, tips, and plugs for blow-type coreboxes are made of

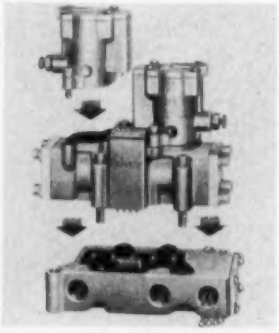


Abra-shun, a highly abrasive resistant plastic material which is said to outwear metal, rubber, and conventional plastics. Design features in-tube retention and easy installation. — **Plastics & Chemical Div., Dike-O-Seal Inc.**, 5820 S. Elizabeth St., Chicago 36, Ill.

For More Details Circle No. 424—Page 53

CONTROL VALVES

Speed King basic ½ in. plug-in type, pilot-operated, 4-way control valves feature fast, automatic completion of electrical and pneumatic



circuits. Units offer one-piece solenoid pilot housings and lightweight aluminum bodies. Pilots built to JIC standards are fully interchangeable on all plug-in valves. Pilot plungers and main valve stem are the only moving parts. No springs are used in the main valve body. Designed for 35-200 psi air service, valves are available with solenoid coils for ac or dc, any voltage or cycle. Integral junction box is standard. — **Valvair Corp.**, 454 Morgan Ave., Akron 11, Ohio.

For More Details Circle No. 425—Page 53

TORCH

Heavy-duty Model H-55 torch is for work requiring air on both sides of the electrode. Outstanding feature is pushbutton air control valve in the handle. Either ½ or ⅝-in. diam electrodes can be used. Torch is heavily insulated and requires only compressed air and welding current.—**Arcair Co.**, P. O. Box 431, Lancaster, Ohio.

For More Details Circle No. 426—Page 53

EPOXY SPRAY GUN

Spray gun designed to spray premixed epoxy formulas is said to reduce plastic laminating time 60 per cent. It will handle material in viscosity ranges from 50 to 30,000 centipoises and features a nozzle which

permits use of expendable cardboard resin container cups. Cups are available in two sizes and hold from ½ to 2 lb of resin. Nozzle is offered in several openings and also can be used to spray liquid parting compounds. Gun operates at 50 to 60 lb air pressure and weighs 1½ lb. —**U. S. Gypsum Co.**, Dept. 139, Plastic Engineering Group, 300 W. Adams St., Chicago 6, Ill.

For More Details Circle No. 427—Page 53

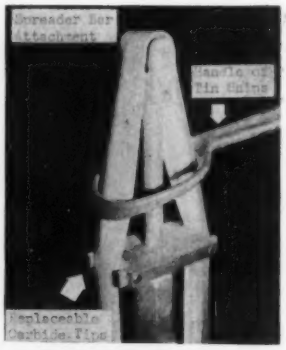
COATED ABRASIVES

Metalite Type 101 resin-bonded aluminum oxide coated abrasives are available on fiber discs and cloth belts. Particularly effective on stainless steel, brass, bronze, and other alloys, the abrasive is claimed to increase abrasive life and decrease discoloration of the metal. Type 101 is said to give extreme sharpness, cool cutting, and durability. Fiber discs are made in grit range from 150 to 24. Belts are available from 180 to 24.—**Behr-Manning Co.**, division of Norton Co., Tenth Avenue and 27th Street, Troy, N. Y.

For More Details Circle No. 428—Page 53

SPREADER BAR ATTACHMENT

Spreader bar attachment for abrasive belt machines simplifies preparation of hard-to-reach inside surfaces. Attachment is equipped with



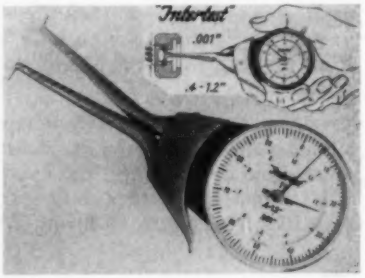
replaceable carbide tips at the points of greatest wear and fits minimum opening of 1⅛ x 1¼ in. Unit accommodates abrasive belts 1 x 90 in. Spreader bar attachment TS-90 is shown being used to remove trim die burr from the fingerholes of tin snips.—**Grinding & Polishing Machinery Corp.**, 2530 Winthrop Ave., Indianapolis 5, Ind.

For More Details Circle No. 429—Page 53

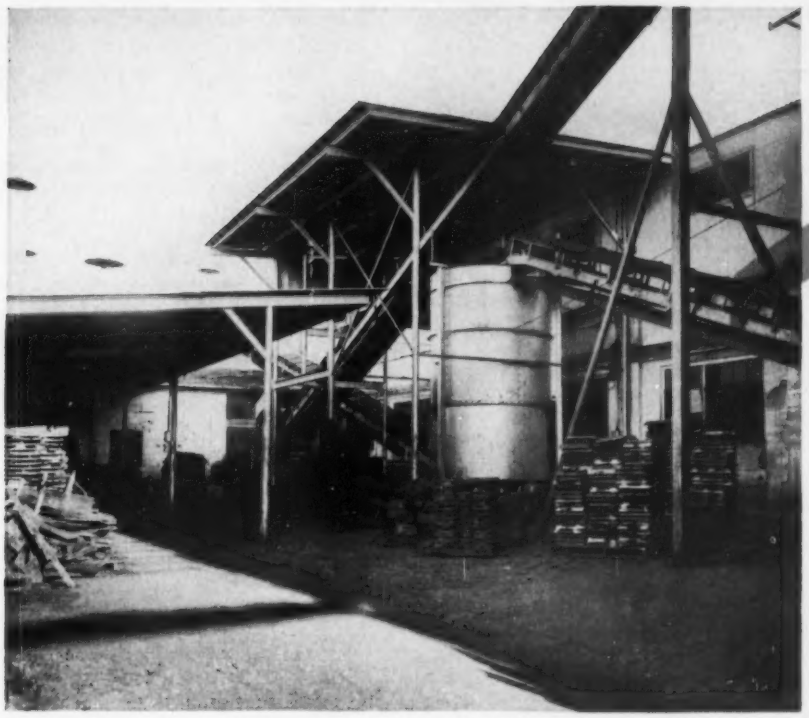
INTERNAL MEASURING GAGE

Intertest dial gage is for measuring narrow, deep areas and small bore diameters. Ranges from 0.2 to 1.6 in. are covered. Graduations are 0.0005 in. on low-range models and 0.001 in. on high-range models.

For unit to act as a comparator, the graduated scale ring can be rotated to set zero at any point of



the range, providing a plus or minus reading. Scale ring and dial are crushproof and inert to the influence of oil and gasoline. Other features include stainless steel plunger, die cast aluminum case, shock-protected mechanism with jewel bear-

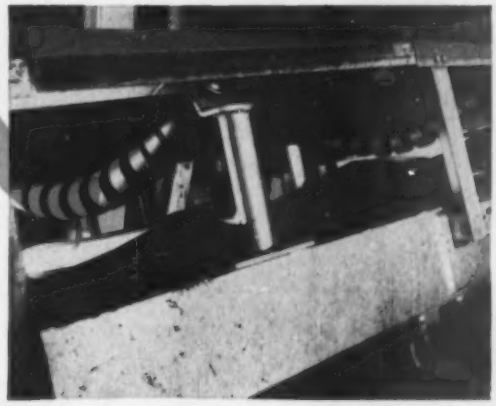


UP TO 10 TIMES THE SERVICE LIFE OF STEEL IDLERS . . . The Joy Limberoller® Conveyor Idler

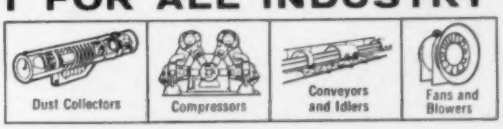
After more than five years of service on foundry sand conveyors, Joy Limberoller idlers have proved they outlast steel idlers as much as ten to one.

The reason for this amazing record is the unusual design of the Limberoller. Instead of having 6 bearings, as a steel idler, the Limberoller has just two. These are mounted at both ends of a flexible wire rope, to which neoprene discs are molded. The bearings are up out of the sand, unaffected by spillage. Fouled bearings, which stop steel idler rolls and cause damage to the belt, are never a problem. Belt life is increased and maintenance costs go down to almost nothing.

Join the foundry management men who have ended their sand conveyor problems by replacing steel idlers with Joy Limberollers. We'll be glad to give you all the details. Write for Bulletin 347-762.



EQUIPMENT FOR ALL INDUSTRY



JOY

Joy Manufacturing Company
Oliver Building, Pittsburgh 22, Pa.

In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario

Circle 623 on Page 53

ings and crackle-lacquer finish.—**Testing Machines Inc.**, 72 Jericho Turnpike, Mineola, N. Y.

For More Details Circle No. 430—Page 53

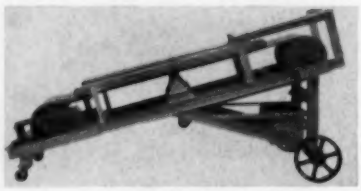
DIFFRACTION QUANTOMETER

X-ray diffraction quantometer is for simultaneous analysis of all elements of interest in a sample, with the provision for electronic readout of the result for each element, one at a time, in desired units of concentration. Analysis can be seen on an illuminated scale, drawn on chart paper, or printed electronically by a computer.—**Applied Research Laboratories Inc.**, P. O. Box 1710, Glendale 5, Calif.

For More Details Circle No. 431—Page 53

CONVEYOR SEPARATOR

Model 1520-HUF permanent magnetic portable conveyor separator unit is designed for removal of tramp metal from foundry sand at the rate of 1000 cu ft per hr.



Head pulley has shaft extension for drive pulley operation. Unit is rated and designed for belt speed of 175 fpm or magntic pulley speed of 45 rpm. — **American Magnetics Co.**, P. O. Box 254, Moline, Ill.

For More Details Circle No. 432—Page 53

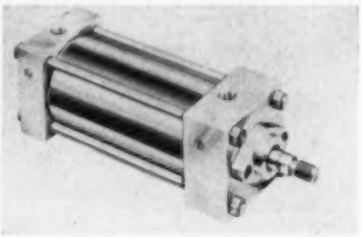
MECHANICAL KNOWLEDGE TEST

Mechanical knowledge test reportedly provides a reliable index of mechanical background and experience on which to base hiring, placing, and promoting. The relatively short-time test (6-A) can be given with minimum supervision because directions to the testee are complete and easily understood. Test features rapid scoring and quick, accurate interpretation. Special training is not necessary in scoring the tests.—**Aptitests**, 31 S. Carpenter Ave., Indiana, Pa.

For More Details Circle No. 433—Page 53

CYLINDERS

Powrmation low-pressure air and hydraulic cylinders are offered in 1½ to 8-in. bores. Mountings are welded to the one-piece steel heads for greater strength. Pressure-safe tube seal, on the outside diameter



of the tube, guards against leakage. A check seal cushion minimizes destructive effects of heavy or high-speed loads. Capacities are 250 psi air and 400 to 1000 psi hydraulic, depending on bore size.—**Hanna Engineering Works**, 1765 Elston Ave., Chicago 22, Ill.

For More Details Circle No. 434—Page 53

ALUMINUM ROOF COATING

Aluminum roof coating is said to cut back better than 70 per cent of the sun's rays. The asphalt-based coating covers cracks and small holes, renews and protects dried-out felt base, and produces a bright, attractive appearance. Material is available fibrated or unfibrated in 5-gal. cans.—**Barrett Div., Allied Chemical Corp.**, 40 Rector St., New York 6, N. Y.

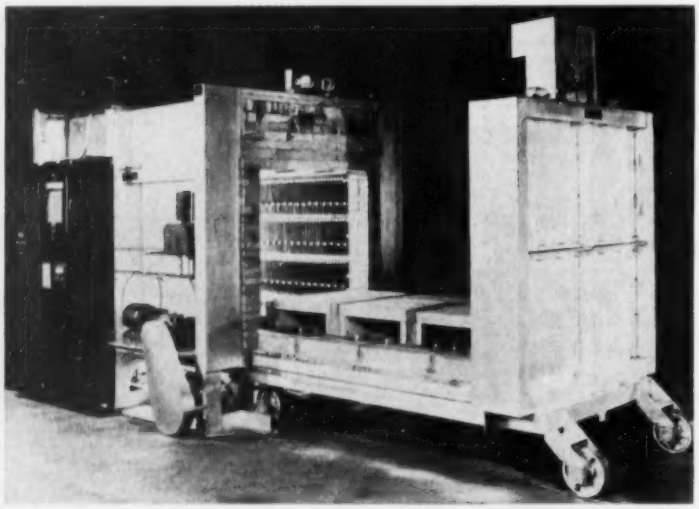
For More Details Circle No. 435—Page 53

WELDING ROD

Airco No. 21 nickel-silver gas welding rod is capable of joining 14 different metals. Designed for superior flow and bonding properties, the rods can be applied in all positions without fuming or overheating the base metals. Rods are available in 36-in. lengths and in five diameters, from 1/16 to ¼ in.—**Air Reduction Sales Co.**, division of Air Reduction Co., 150 E. 42nd St., New York 17, N. Y.

For More Details Circle No. 436—Page 53

Car-Bottom Furnace Is Self-Contained



Self-contained car-bottom furnace requires no rails or pits below floor level and can be moved intact whenever necessary. Car is motor-driven by a rack and pinion gear. Additional wheels pick it up in the furnace.

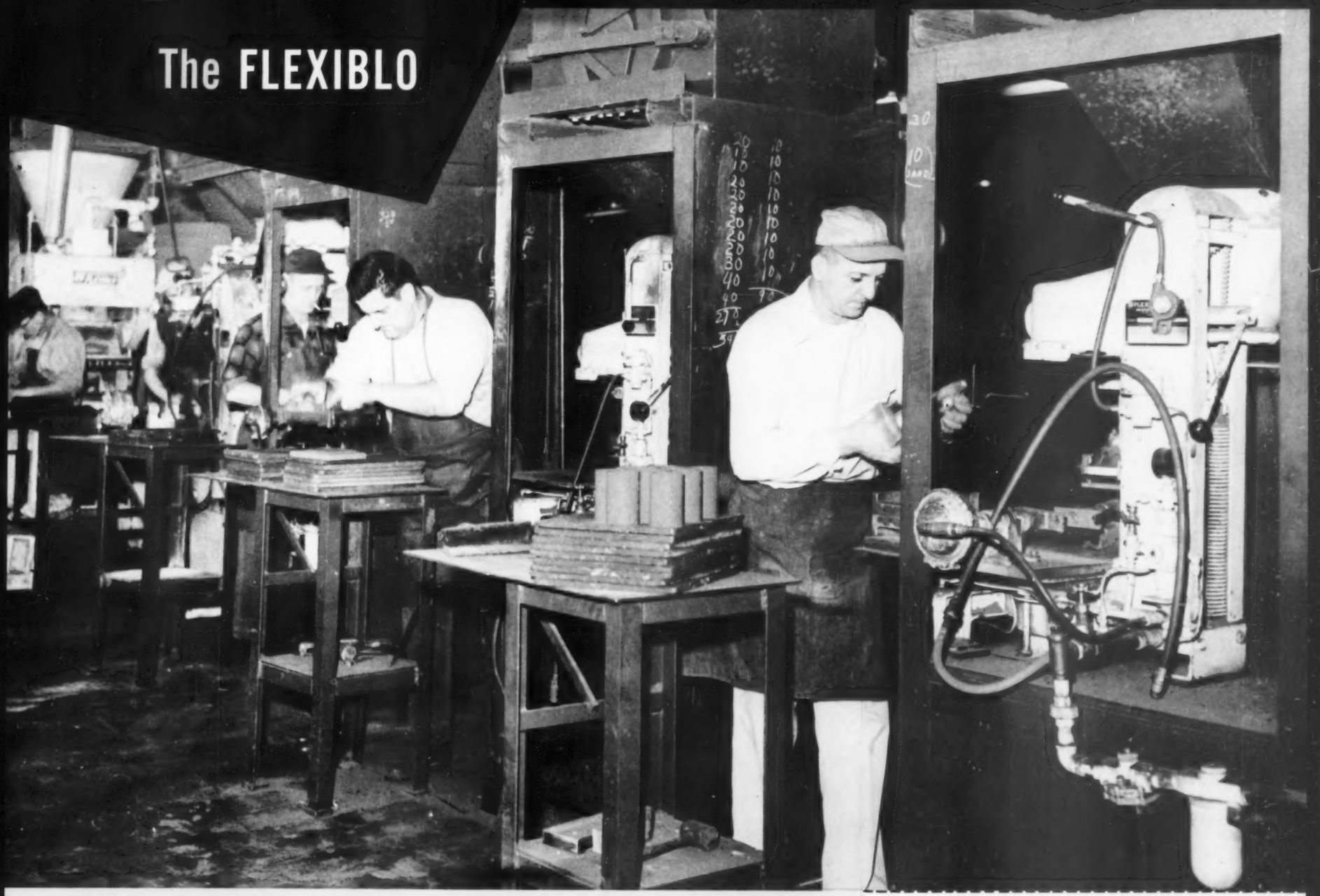
Heating elements draw a maximum of 100 kw and are mounted on both side walls, the back wall, the door, and the car. Elements connect to a 440-v, 3-phase, 60-cycle contactor, and power demand can be modified by a time switch.

Motor-driven fan in the roof provides circulation at lower temperatures. Water-cooled shaft permits operation at 1800° F. Furnace illustrated is 3 ft wide, 3 ft high, and 6 ft long.—**Waltz Furnace Co.**, Dept. 29, 1901 Symmes St., Cincinnati 6, Ohio.

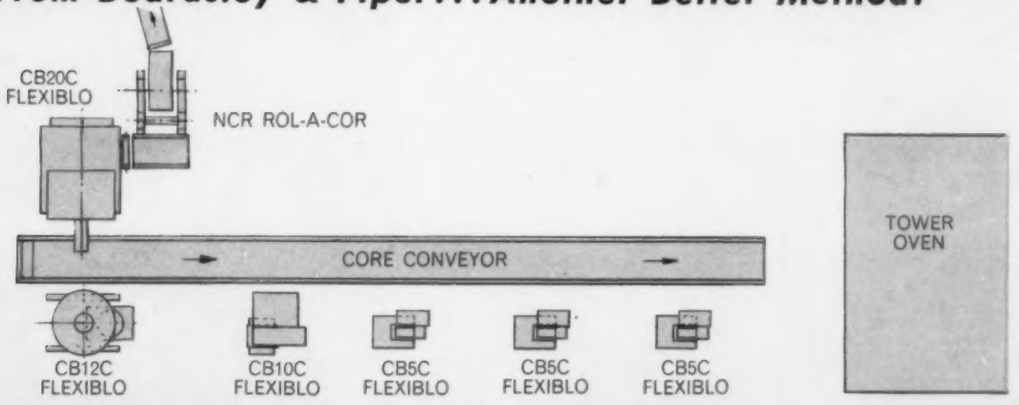
For More Details Circle No. 440—Page 53

Circle 624 on Page 53→

The FLEXIBLO



From Beardsley & Piper... Another Better Method!



Sure I'm interested in your research and its results!*
Send me the whole story on:

☐ FLEXIBLO ☐ FLEXIGAS
☐ NCR ROL-A-COR ☐ TR ROL-A-COR

NAME_____

POSITION_____

FIRM_____

ADDRESS_____

CITY_____ STATE_____

**NO OBLIGATION OF ANY KIND*

Picture at Farrell-Cheek Steel Company Shows...

- ***CB5C FLEXIBLOS*** providing four times greater production than hand methods . . . 20% greater production than previous blower.
- ***CB10C FLEXIBLO*** providing up to seven times more production than previous methods.
- ***CB12C FLEXIBLO*** providing up to five times more production than previous methods.

All with a 30% manpower reduction!

In addition, a CB20C FLEXIBLO and NCR ROL-A-COR team is now being installed to produce their largest cores at typical Flexiblo savings.

WHY FLEXIBLO?

Exhaustive comparison of all available core blowers convinced Farrell-Cheek that the Flexiblo line would most effectively cut soaring core room costs . . . and without modification of existing wood and metal core box equipment.

Management's appreciation of dependability and quality is reflected by their continued use of B&P equipment. Beardsley & Piper's extensive engineering facilities and knowledge of modern foundry requirements assures you that B&P equipment will accomplish *your* job better, faster and at the lowest possible cost.

FIRST CLASS
PERMIT NO. 27907
CHICAGO, ILL.

BUSINESS REPLY MAIL
NO POSTAGE STAMP NECESSARY IF MAILED IN THE UNITED STATES

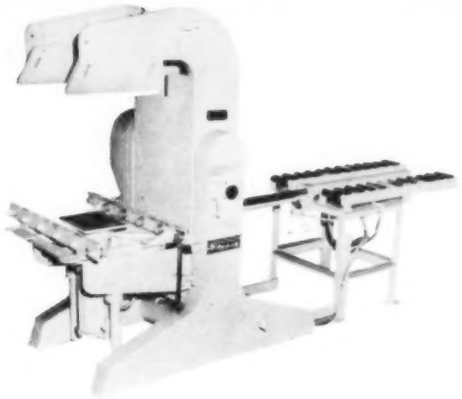
POSTAGE WILL BE PAID BY
BEARDSLEY & PIPER
2424 N. Cicero Avenue
Chicago 39, Illinois

NEW CORE ROOM EFFICIENCY... Your Bonus From B&P Research

Fastest Core Handling– Most Accurate Draws

Jobbing and production foundries alike cut core room costs to the minimum with B&P ROL-A-CORS.

The NCR ROL-A-COR is especially designed to handle the cores produced on the large Flexiblo Core Blowers. Exceptional flexibility makes the NCR ideal for work of a jobbing nature. Cores can be rolled in and out of the NCR in any combination of 90 or 180 degrees. An extremely rigid draw mechanism and one piece steel side frame and base assure years of accurate, trouble free service.



The trunnion type TR ROL-A-COR provides outstanding efficiency for high speed core production. Uniformity and high quality is assured cycle after cycle through automatically controlled operation . . . no need for a skilled operator. One core is blown while another is rolled over . . . a single push of the control button completes the cycle. The TR ROL-A-COR is the perfect core rollover unit to team with highly productive Flexiblos for the ultimate in core room efficiency.

Speed Co_2 Coremaking

The CO_2 process can now be used with a wide range of core boxes on a *real* production basis. The FG 12-20 Flexigas can be teamed with the highly productive CB12, CB15, CB18 and CB20 Flexiblo Core Blowers to provide completely cured cores automatically, in short gassing cycles. The FG 12-20 can also be combined with the FG 5-10 Flexigas to efficiently gas a wide range of cores. Flexigas units are push button controlled and have a simple, maintenance free, all pneumatic control circuit. An optional roller conveyor frame makes the handling of large core boxes easy. Two types of automatic Horizontal Clamps are available for gassing vertically-parted core boxes.

FG 5-10 Flexigas units (not illustrated) provide a new standard of efficiency in the production of small CO_2 cores. Two FG 5-10 gassing machines teamed with a CB5 Flexiblo produce completely cured CO_2 cores at oil core production speed.

BEARDSLEY & PIPER CORE ROOM EQUIPMENT INCLUDES: FLEXIBLO CORE BLOWERS • SAN-BLO CORE BLOWERS
NCR ROL-A-COR • TR ROL-A-COR • FLEXIGAS • SPEEDMULLOR • MULL-ALL • MULBARO • WHIRLMIX • WONDER WIRE CUTTER
• CLIMAX WIRE STRAIGHTENER • VIBRA-DRAW

USE THIS CARD TO LEARN ABOUT YOUR STAKE IN B & P RESEARCH

Industry Briefs

Muncie Malleable Foundry Co., Muncie, Ind., has been acquired by Albion Malleable Iron Co., Albion, Mich., and will be operated as a new division. The acquisition will boost Albion's capacity about 35 per cent. In addition, Muncie is better suited to production of medium, short run, and larger castings than the highly mechanized operation at Albion. Ralph J. Whitinger, former president at Muncie, will be a member of the board of directors of the parent company.

Pennsylvania Malleable Iron Corp., Lancaster, Pa., is installing an electric annealing oven at its new foundry at Landisville, Pa. A roller hearth type furnace designed for continuous operation, it will supplement annealing capacity of the plant's periodic type ovens. The installation, including cost of new buildings, involves an expenditure of $325,000.

Refractory & Metallurgical Products Co., 12115 Woodbine, Detroit 39, has been formed to manufacture super-refractory products. Officers are Raymond W. Morgan, president and treasurer, and Warren L. Pell, vice president and secretary.

Dreisbach Engineering Corp., Yonkers, N. Y., has assigned In-Plant Rental Corp., 21 E. Washington St., Washington, Pa., exclusive sales rights for Dreisbach metal reclaiming mills in Pennsylvania, western New York, Ohio, Michigan, Illinois, Indiana, and West Virginia.

Pickands Mather & Co., Cleveland, has moved its pig iron and coke sales office from Washington, D. C., to 1734 RCA Bldg., 30 Rockefeller Plaza, New York.

Canton Malleable Iron Co., Canton, Ohio, has completed a $300,000 expansion of facilities. Expansion included construction of a 5000-sq-ft melt shop and installation of a cupola and a holding furnace to refine molten iron. A new annealing oven and eight molding conveyor lines also are being installed.

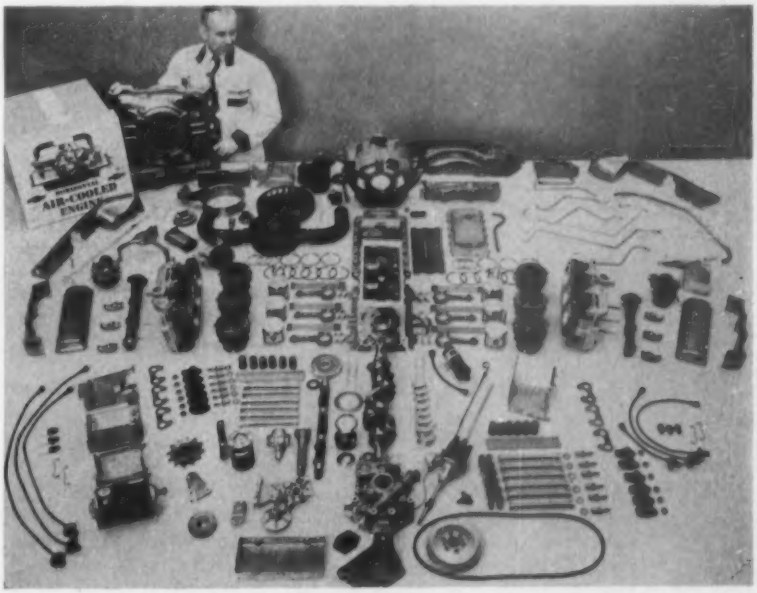
Osborn Mfg. Co., Cleveland, has appointed Midvale Mining & Mfg. Co., 5015 Manchester Ave., St. Louis 10, Mo., as sales and service representative for its molding machine division in Missouri, Kansas, Nebraska, Oklahoma, Arkansas, southwestern Illinois, and metropolitan Council Bluffs, Iowa. Webb L. Kammerer is president of Midvale.

Westover Corp., Milwaukee management service firm, has separated itself entirely from the foundry equipment division with which it formerly was associated. C. E. Westover has been elected chairman of the board of the organization, which will be devoted completely to management work. Jeff A. Westover is president and treasurer, and Forrest E. Noggle is vice president and secretary. The former division has been set up as a separate corporation, Nomad Equipment Corp., and will engage entirely in the manufacture and sale of foundry equipment. Oscar H. Kraft is president.

Textile Machine Works, Reading, Pa., is installing new ovens and porcelainizing equipment which are expected to more than triple the company's production capacity of Prizer-Ware, its cast gray iron cookware.

Associated Foundry Services Inc., 7600 A. Avalon Blvd., Los Angeles 3, Calif., has been appointed sales and service representative in eleven western states by Revecon Furnace Co.

Union Carbide Metals Co., division of Union Carbide Corp., New York, has reduced the price of low-carbon ferrochrome 1 cent per pound of chromium and that of



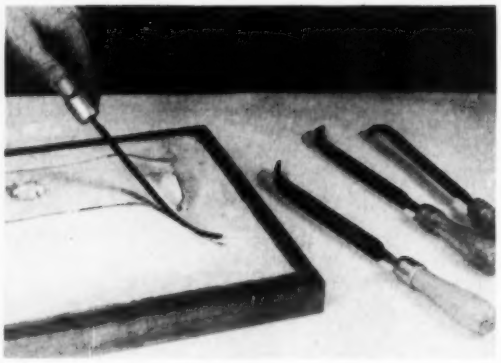
THE CORVAIR 80 hp, horizontally opposed, six cylinder engine is shown in this exploded view. Although widely called an all-aluminum engine, only about 28 per cent of its 366-lb weight is of the light metal. The individual cylinders are shell molded gray iron. Other cast iron and steel parts are included

HOW To Do It

FOUNDRY will pay a minimum of $15 for each "How To Do It" idea submitted and published

Convert Old Files To Core Room Tools

By H. J. GERBER
Assistant Professor
Metalworking Technology
Oklahoma State University
Stillwater, Okla.



SPECIAL FILES are used in modifying or cleaning up plaster matches of patterns having irregular parting lines and baked sand cores. These tools are easily made by torch heating standard files and bending them to various curvatures. After bending, the files are reheated to critical temperature again with a torch and quenched to reharden them.

A variety of cross-sectional shapes of files can be used. Those that are too dull for further use in the shop are still good enough for processing plaster matches and cores.

40/43 ferrochrome-silcon 2 cents per pound of chromium. Other reductions include standard ferromanganese, 1.25 cents per pound; silicomanganese, 1.2 to 1.3 cents; and medium - carbon ferromanganese, 1.5 cents. Reductions also have been made on exothermic ferromanganese, low-carbon ferromanganese, ferromanganese briquets, and silicomanganese briquets.

Woodruff & Edwards Inc., Elgin, Ill., has purchased the Richmond Foundry & Mfg. Co., Richmond, Va., and will operate it as a division. Both companies produce gray iron castings.

International Sales Corp., 1230 Westlake Ave. N., Seattle, has been named a representative for Marblette Corp., Long Island City, N. Y.

Alloy Metal Abrasives Co., Ann Arbor, Mich., has appointed Sierra Foundry Supply, San Gabriel, Calif., as a representative.

Harkins Engineering Sales Co., 6349 Guilford Ave., Indianapolis, has been appointed sales representative for Ajax Flexible Coupling Co. Inc., Westfield, N. Y.

Al-Fin Div., Fairchild Engine & Airplane Corp., West Babylon, L. I., has been turned over to Al-Fin Corp., Bethel, Conn., a newly formed concern.

Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., has changed its name to the Birdsboro Corp.

Yale Materials Handling Div., Yale & Towne Mfg. Co., has moved its Chicago industrial lift truck and Y-18 tractor shovel sales and service branch to 9335 Belmont Ave., Franklin Park, Ill.

Engineering Principles Topic Of Annual FEF Conference

Engineering principles involved in the production of castings will be the chief topic for discussion at the 1960 College-Industry Conference of the Foundry Educational Foundation.

The annual conference, to be held at the Statler Hilton, Cleveland, March 16-17, also will include the annual meeting of the FEF.

Technical program of the conference has been arranged to cover the fullest range of fundamental concepts applicable to the practical solution of foundry problems. The subjects will be presented by well known authorities from various of the FEF schools.

Two luncheon sessions and a reception also are on the program, details of which follow:

Wednesday, Mar. 16

8 a.m.—Breakfast and meeting of trustees and FEF professors.
10:45 a.m.—Annual Meeting.
12 noon—Luncheon: "Engineering Education in Transition," Dean Curtis L. Wilson, Missouri School of Mines and Metallurgy.
2 p.m.—"The Impact of Engineering Educational Trends on the Metal Casting Industry of the Future," Prof. H. F. Taylor, Massachusetts Institute of Technology.
"Mechanics of Solids," Prof. Merton Flemings, Massachusetts Institute of Technology.
"Mechanics of Fluids," Prof. J. F. Wallace, Case Institute of Technology.
"Transfer and Rate Processes," Prof. R. A. Flinn, University of Michigan.
"Thermodynamics," Prof. P. C. Rosenthal, University of Wisconsin.
6 p.m.—Reception.

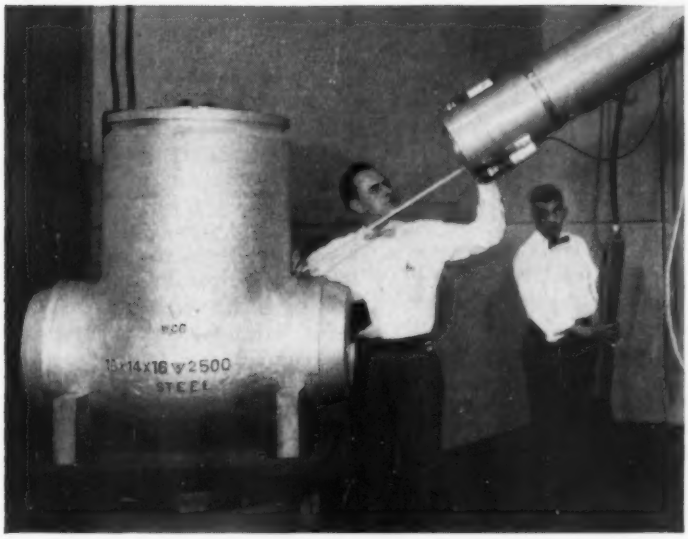
Thursday, Mar. 17

9 a.m.—"The Electrical Sciences," Prof. M. S. Burton, Cornell University.
"Nature and Properties of Materials," Prof. R. E. Swift, University of Kentucky.
"Engineering Analysis and Design," Prof. B. W. Niebel, Pennsylvania State University.
11 a.m.—Special Report: "Production Engineering," Prof. E. P. DeGarmo, University of California.
12 noon—Luncheon: "A Full House," Elmer E. Braun, Central Foundry Div., General Motors Corp., Saginaw, Mich.

Foundry Material Handling Course Offered by MHEDA

The Material Handling Equipment Distributors Association National Training Center is offering a one-week course in foundry material handling starting April 25, 1960. The course will concentrate on material handling methods and equipment applications in the foundry industry.

For further information contact the Director, MHEDA National Training Center, Box 537, Newport, R. I.



The new 2-Mev X-ray generator and Kodak Industrial X-ray Film, Type AA, will help ACCO step up productivity by 9 times.

New 2-million-volt X-ray generator and Kodak Industrial X-ray Film give ACCO Steel Casting and R-P&C Valve Divisions of American Chain & Cable Company new inspection speed with fine radiographic quality.

Down goes inspection time— Up goes productivity

INDUSTRY TODAY is calling for more and more valves for higher pressures. These must be high-quality steel castings, and sound throughout.

To be sure of this quality, American Chain & Cable Company makes full use of radiography. And now with a 2-Mev generator and radioactive sources, together with Kodak Industrial X-ray Film, Type AA, inspection time has been greatly reduced and higher productivity facilitated.

Foundrymen everywhere—in large plants and small—find radiography a big factor in pleasing customers and building business. If you would like to know how it can help you, get in touch with an X-ray dealer or write us for a Kodak Technical Representative to call.

Read what Kodak Industrial X-ray Film, Type AA, does for you:

- Speeds up radiographic examinations.
- Has high film contrast, giving increased detail visibility and easy readability at all energy ranges.
- Provides excellent uniformity.
- Reduces the possibility of pressure desensitization under shop conditions.

EASTMAN KODAK COMPANY

X-ray Division Rochester 4, N. Y.

Kodak

Circle 625 on Page 53

Steel Founders' Society Promotes

Casting Applications

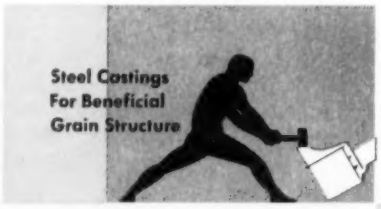
New booklet is intended primarily to promote the use of steel castings by creating ideas for their application in parts which now are made by other methods

By JACK C. MISKE
Associate Editor

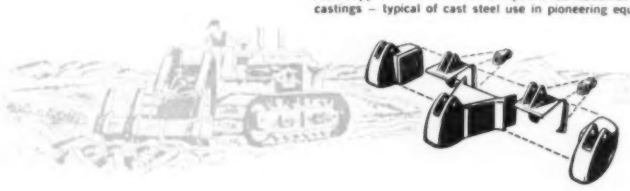
● FRESH EVIDENCE of the foundry industry's growing awareness of the need to seek new markets for its products—that's "Sinews of Modern Living," a new 30-page booklet being distributed by members of the Steel Founders' Society of America.

The booklet's cover is reproduced on the cover of this issue of FOUNDRY, and the two pages shown below make up one of ten such spreads in the booklet which describe existing market areas for steel castings.

The two pages shown here illustrate use of steel castings in highway construction. Others deal with their application in such areas as home and industry, railroads, better living, transportation, metalworking machinery, mining, wood and pa-



Rock Ripper frame below is a composite fabrication of 11 steel castings – typical of cast steel use in pioneering equipment.



OUR GREAT HIGHWAYS

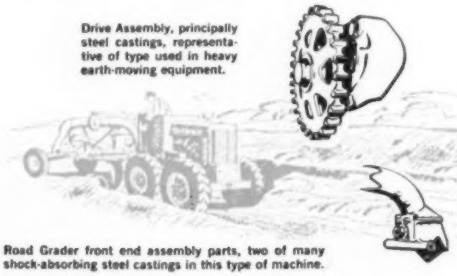
Bridge steel castings include this tower saddle – 68,000 lbs., and rocker shoe assembly, 8400 lbs. – others down to a few pounds.

RUGGED AND POWERFUL MACHINES that slash through hills and level valleys to provide broad highways for ever-increasing traffic, exemplify the stamina of structures cast in steel.

Key parts of these brute-strength machines are produced of carbon and alloy cast steel, heat-treated to withstand the shock, tension, compression and torsion loads to which equipment of this type is repeatedly subjected.

Power Shovel base, 39,600 lbs., and buckets up to 14,000 lbs. – virtually all steel castings. Cast tooth gear, another cast steel part.

Drive Assembly, principally steel castings, representative of type used in heavy earth-moving equipment.



Road Grader front end assembly parts, two of many shock-absorbing steel castings in this type of machine.

per production, material handling, and other uses, including our defense organization.

Prime purpose of the booklet is to promote the use of steel castings by generating ideas for their application in parts now made by other methods. In addition, it is felt that the booklet will prove valuable as an effective employee relations and public relations piece.

All told, it depicts 77 machines and structures representing metalworking and metals user markets. Drawings illustrate 204 representative steel castings used in these applications. They were selected from nearly 1100 photographs and references furnished by 45 SFSA member companies and 86 customer companies.

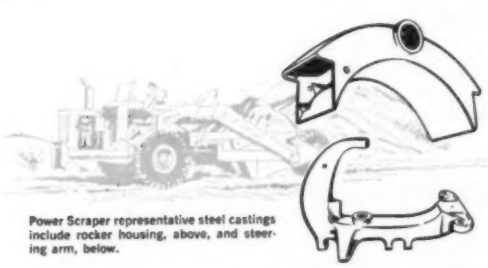
Sketches were employed as a means of showing clearly both the representative castings and their end uses. This technique avoided difficulties due to variations in photographic methods at the same time that it provided an attractive style of presentation.

Initial printing of the booklet totals 40,000 copies, of which 34,000 were sold in advance to SFSA member companies for distribution to customer and casting user personnel, plant visitation groups, professional engineering groups, service clubs, chambers of commerce, employees, vocational counsellors, secondary school teachers, and engineering college students. In addition, the society will distribute about 5000 copies to engineering educators, libraries, and government personnel.

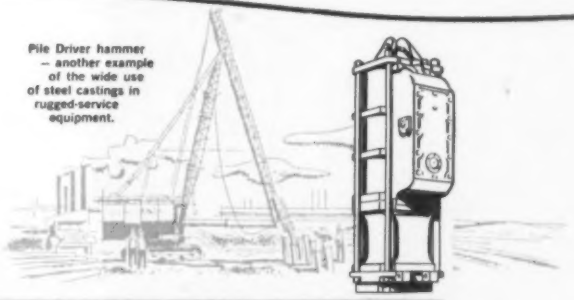
Preparation of the booklet was handled by the SFSA Advertising and Public Relations Committee and its booklet subcommittee. Members of the subcommittee include A. S. Breithaupt, Dodge Steel Co., Philadelphia, chairman; G. T. Johnson Jr., Buckeye Steel Castings Co., Columbus, Ohio; L. A. Neef, St. Louis Steel Casting Inc., St. Louis; E. A. Parker, American Steel Foundries, Chicago; and James Sweeney, National Malleable & Steel Castings Co., Cleveland.

The project was part of the society's market development program, which is headed by George K. Dreher, market development director.

The two pages shown below are one of ten such spreads in the new SFSA booklet. All of them describe existing market areas for steel castings

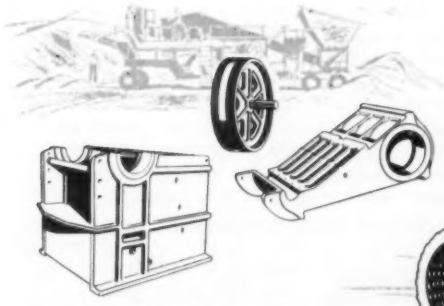


Power Scraper representative steel castings include rocker housing, above, and steering arm, below.

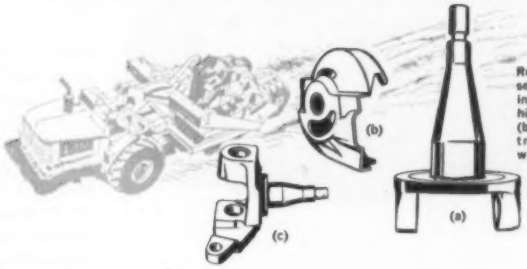


Pile Driver hammer — another example of the wide use of steel castings in rugged-service equipment.

and the role of STEEL CASTINGS



Rock Crusher steel castings include housing, jaws, drive wheel and other heavy-duty parts.



Rock Hauler representative parts cast in steel are (a) 43" high hollow king pin (b) 100-lb. cable control unit cover (c) wheel spindle.

Compactor grid roller for high-speed work — made of 10 super-strength 248-lb. steel castings; idler wheel is a typical tractor steel casting.

A SURE WAY TO INCREASE YOUR . . . FOUNDRY PROFITS

Take advantage of these PLUS VALUES

USE ABC FOUNDRY COKE!

HIGHEST FIXED CARBON . . . ABC standard foundry coke improves melting ratios . . . is most efficient for gray iron cupola melting.

CONSISTENT QUALITY . . . ABC's laboratory staff maintains close chemical and physical control and supervises daily operations of our production-size test cupola.

UNIFORM COKE SIZE . . . Each carload is carefully screened to sizes "Just Right" for every cupola requirement.

PRODUCTION-SIZE TEST CUPOLA . . . Only ABC maintains this facility for regular checks of carbon pick-up and temperatures. Results are available to ABC customers to help forecast coke performance.

EXPERIENCED MELTING SERVICE . . . ABC's staff of practical cupola service engineers has unexcelled experience and is always ready to help users produce better castings at lower melting costs.

ABC produces standard foundry coke for gray iron melting and several grades of special and malleable foundry cokes. Whatever your carbon pick-up requirements, be it high, medium or low, ABC has a coke tailored for your need. ABC's annual productive capacity of over 900,000 tons of strictly merchant coke is your assurance of dependable service under all conditions of supply and demand. Forty years of experience in the production of premium quality foundry coke is your guarantee of better melting with fewer rejects and higher profits.

A TRIAL ORDER WILL CONVINCE YOU!

ALABAMA BY-PRODUCTS CORPORATION

General Sales Office:
First National Building
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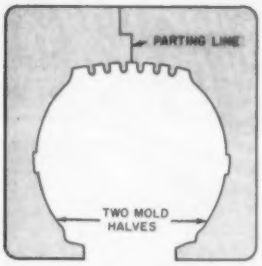
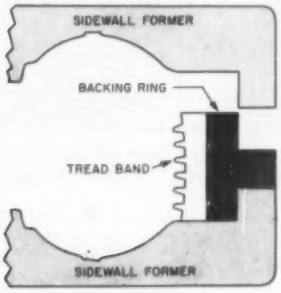
Sales Agents:
Great Lakes Foundry Sand Company, Detroit; St. Louis Coke & Foundry Supply Co., St. Louis; The Ranson and Orr Company, Cincinnati; Kerchner, Marshall and Company, Pittsburgh; Balfour, Guthrie & Company, Ltd., San Francisco; Anselman Foundry Services, St. Charles, Illinois

Circle 626 on Page 53

New tire mold uses a one-piece tread band and separate sidewall formers of cast aluminum. The design is said to provide a number of advantages



Traditional mold parting at center of tread is said to restrict tread design and make mismatch possible



Parting of new mold at each side of band provides unmarred tire tread

New Tire Mold Cast by

CO_2 and PLASTER PROCESSES

By ROBERT H. HERRMANN
Associate Editor

A NEW TYPE mold for producing automotive tires has been developed by Firestone Tire & Rubber Co., Akron, Ohio. Casting production techniques for the new mold were developed in co-operation with Morris Bean & Co., Yellow Springs, Ohio.

The newly designed mold employs a one-piece band casting which forms the tire tread. This differs from previous designs which involve molds that part near the centerline of the tread. Among the advantages said to be achieved by the new tire mold are greater freedom in tread design, improved precision in tires, easier mold revisions, quicker change of molds in curing equipment, and adaptability to different types of tire curing equipment.

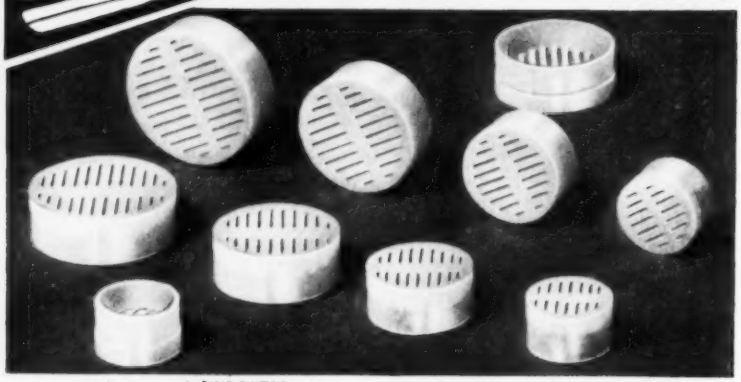
Components making up the tire mold consist of the tread band about 1½ in. thick, a backing ring to support the tread band, and two sidewall forming units. All are cast of 214 aluminum alloy.

The bands are cast in a mold consisting of an Antioch Process material ring core which forms the tread face on the inner periphery of the casting, and a circular sodium silicate-bonded sand mold section which forms the outer periphery and one edge of the tread band. This mold section also contains the gating and risering system. The core and mold section are assembled on a water-cooled chill table which forms the other edge of the tread band.

Make Tread Band Core — The ring core consists of eight segments, each produced in a corebox fabricated with plaster and plate aluminum sides and having at one end a tread-forming section of flexible vinyl plastic. The plastic section forms the face of the core segment that will be in contact with the metal in the mold. Because the tread design incorporates complicated configurations, including undercuts, a flexible corebox material is required to permit drawing the segment after the core material sets. The Antioch Process material used for these segments is a mixture of 50 parts washed silica sand, 40 parts molding plaster, 8 parts talc, and small amounts of sodium silicate, portland cement, and terra alba. The last material accelerates setting time of the plaster to bring it into a 4 to 7 minute range.

A slurry is prepared from the

NEW NON-CLOGGING NYLON CORE VENTS
WITH EXCLUSIVE LOCK IN SLOT CONTROL
(ALL STANDARD SIZES FROM 3/16" TO 1 1/2")



SAVE TIME and MONEY with one standard Non-Clogging Vent for All Blowplates and Core Boxes.

- Out lasts metal vents 3 to 1.
- Acid, Oil and Steam resistant.
- Easily and quickly contoured to shape of box.

Samples on request. . . Phone, Wire, Write Today!

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INterocean 8-7700
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Circle 627 on Page 53

"The Moulders' Friend"
MOBILE SAND CONDITIONER

BRUSH LENGTH
50" 60" 70"

OVERALL WIDTH
70" 80" 90"

THROAT WIDTH
53" 63" 73"

THROAT DEPTH
23" 23" 23"

The Molders' Friend goes anywhere in the shop under its own power, and thoroughly conditions two tons of sand in one minute. All it requires is a few pennies per ton for operation, and the attention of one man. Its rotary brush quickly mixes and aerates the sand—mixes, moistens and screens it so rapidly and economically that no foundry can afford to be without one. See one in operation.

Call or write for free literature

"The Moulders' Friend"
Dallas City, Illinois

above mixture with water. Before the slurry is poured into the core-box, stainless steel inserts are hand set into fissures of the flexible core-box section. These inserts will be transferred from the pattern to the core segment and subsequently to the cast tire mold. They form the tread design fissures in the tire.

After the segments have been poured and the core material sets, they are removed from the box and inspected. Inspectors check dimensions with gages. Approved segments are loaded on racks and placed in an autoclave for 6 to 8 hr at 15-17 psig to dehydrate the mold. Rack loads of segments are removed from the autoclave and allowed to stand at room temperature for 14-15 hr to rehydrate. During this time plaster at the interior of the segments becomes granular and permeable.

Workers then place the racks in ovens at about 450° F for 9-12 hr to remove all free water and part of the chemically combined water. Dried segments are assembled on a circular metal plate, a radial checking arm and templates being used to locate them properly. A crane lifts the plate with circular core attached and locates it on a water-cooled metal table.

Use CO_2 Mold Section — The sodium silicate-bonded sand mold section which is placed over the core is produced in a wooden core-box. A metal band is placed in the box before the sand is dumped in. Internal supports on the band lock with the rammed sand. A lip around the outside of the band permits the cured mold section to be clamped to the table on which the mold will be poured. The sand is hand rammed and cured with CO_2 through holes in the bottom board of the box.

The cured, circular mold section is located on the water-cooled table and clamped in position. Molds are poured with 214 aluminum alloy at about 1340° F.

A crane lifts the poured mold by a center post attached to the assembly plate and moves the poured mold to knockout. Portable pneumatic vibrating tools are used to shake off sand and plaster material. The small amount that adheres to the casting is blasted away with glass beads and water in a reach-in cabinet.

MODERNIZE and COMPETE!

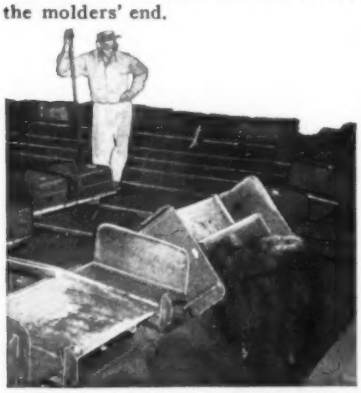
NOMAD EQUIPMENT

pays off!

with
INCREASED PRODUCTION
and
PROFIT-MAKING EFFICIENCY

Produce more molds per day using NOMAD CONVEYORS. Each man hour is more productive because molds are no longer carried away by the molder. Instead, molds "roll away" on conveyors.

NOMAD SAVES VALUABLE FLOOR SPACE with Double Level Track. This "2 in 1" conveyor gives additional saving of manpower when equipped with a Mold Dump at the shakeout end and a Pallet Raiser at the molders' end.



The gravity type Mold Dump shown above is of simple design and sturdy construction. It features a fast dumping cycle and effortless operation. A wide variety of mold sizes can be handled.

IT'S LOW COST MODERNIZATION!

Write for information.

NOMAD EQUIPMENT

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Circle 629 on Page 53

Gates and risers are removed with electric saws, and the stubs are chipped off. Workers use hand tools to remove flash that may exist at the core segment joints. Casting yield is 40-45 per cent.

After inspection and gaging, the 50-lb tread band is stretched in a special machine to bring it into roundness tolerance, inspected and gaged again, then shipped.

Making Sidewall Sections — A corebox is formed in much the same manner as the tread band corebox, except that in this case the pattern can be rigid. The core produced in this box, after processing, is located on an assembly plate. A CO_2 process mold segment is clamped over it and the mold poured. The casting is cleaned, inspected, gaged, and shipped.

Gray Iron Founders Sponsors Iron Casting Design Service

A co-operative iron casting design service to serve the metalworking industry in the United States and Canada has been announced by the Gray Iron Founders' Society Inc. and Designers for Industry Inc.

Gray Iron Founders' Society, the national trade association of gray iron foundries, at present helps casting users to solve metallurgical and technical foundry questions through member foundries.

Designers for Industry Inc., 4241 Fulton Parkway, Cleveland 9, Ohio, an independent engineering research and development firm, will serve as specialists in casting design, cost reduction, specifying, and associated technical areas.

CEMA Elects New Officers

The Conveyor Equipment Manufacturers Association has announced its new officers, elected at the group's annual meeting. They are Orlan A. Johnson, Gifford-Wood Co., Hudson, N. Y., president; E. H. Woodberry, Industrial Products Div., Lamson Corp., Syracuse, N. Y., re-elected vice president; E. L. Weinthaler, Conveyor Systems Inc., Morton Grove, Ill., director; G. H. Woodland, Chain Belt Co., Milwaukee, secretary; and H. A. Barber, Barber-Greene Co., Aurora, Ill., treasurer. R. C. Sollenberger was re-elected executive vice president.

metal abrasives

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We can now make, and deliver in every shipment, the exact type of "Malleabrasive" shot or grit that will do **your** particular job best . . . and at lowest cost to you.

With new, precision controlled equipment and specialized techniques "Malleabrasive" is now job-made to meet each individual cleaning condition.

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Mansfield, Ohio

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MALLEABRASIVE

Circle 630 on Page 53

International Minerals & Chemicals

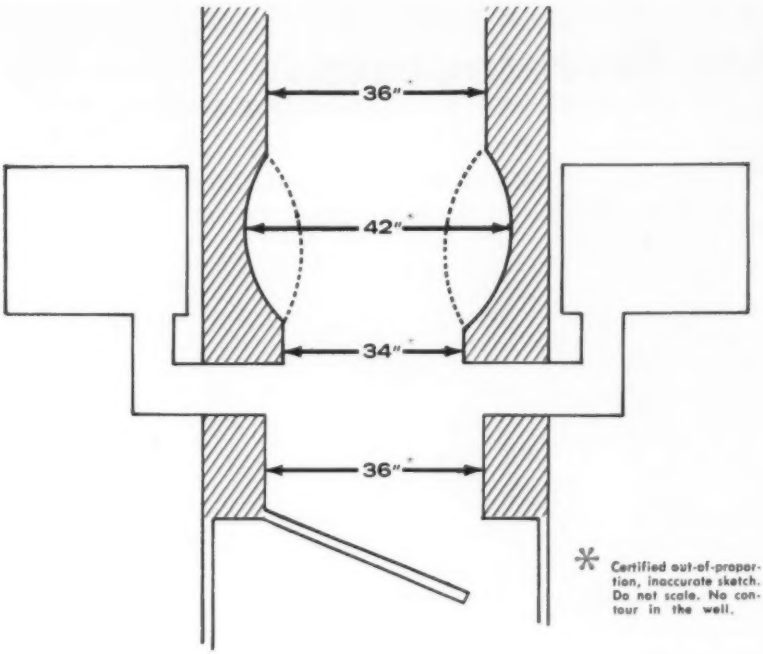
A REPORT TO FOUNDRIES

FROM TOM BARLOW

When is a contour?

Having recently dropped in on a cupola course of T&RI, I'm in the mood to talk cupola practice. Hope you are in the mood to listen. (Readers interested in sand and molding only, please come back next month.) Since the cupola is a complicated gadget, let's look at the patching practice. It is one important detail which is often slighted — both metallurgically and economically. Judging from the questions asked me, we can further narrow the talk to contour patching, and still have more to say than space permits.

Like most English words, "contour" means different things to different people. A friend of mine raises show horses — he refers to the excellent contour of his horses. Another friend reads *Playboy* (he's an amateur cook and they have wonderful recipes). He often quotes figures on contour that couldn't possibly refer to a horse. Since you and I are more interested in cupolas, contour refers to the dimension (diameter) of (1) the stack, (2) the melting zone and (3) across the tuyeres. A perfect 36-inch cupola, for example, might be 36-42-34.



Contour patching is logical, practical and economical. The secret is to patch the cupola to the same general shape it's going to end up at. (My kids say a preposition is a lousy thing to end a sentence with.) It's going to burn out that way anyway, so "if you can't beat them, join them." Occasionally the patching crew assumes that you should put in more patch where it burns out the most. This creates a Mae West (dotted lines) or boshed-in contour. Such shapes (in cupolas) are bad. They result in excessive burnout, slumping, bridging and other problems. The explanation can be made to sound complicated, but essentially it is related to the ability of the patch to let heat out — thermal conductivity. If some of the heat doesn't get out, the face of the lining gets too hot. As a result, slag attack is speeded up — along with more spalling and erosion. Burnout is rapid until the cupola again regains the proper contour and releases heat fast enough to keep the face down to a reasonable temperature.

This point can be illustrated by using the extremes. Insulating brick behind the lining has been tried; it failed miserably. Why? Because the heat couldn't *get* out — so the lining *burned* out. At the opposite extreme, some cupolas use water coolers behind a thin lining. The coolers don't *burn* out because the heat *gets* out.

To summarize, contour patching reduces the actual burnout because slag reactions are slower and spalling and erosion are reduced. It is cheaper. Maybe even more important, however, is the improvement in melting practice. Reducing the burnout obviously reduces the change in dimension. In other words, the cupola diameter is more uniform. When this is true, you are more apt to get uniform cupola operation — and, therefore, more uniform metal. Surely it is difficult to have uniform pressure, melting rate, carbon, silicon, etc., when a cupola changes from 36-28-34 in the morning to 36-46-34 by night. How much easier to start with 36-42-34 and burnout to 36-46-34.

As usual, we have a financial interest in this problem. (Honesty is *so* necessary these days.) We originated gun patching twelve years ago because gun patching is by far the easiest way to patch to a smooth, uniform, controlled contour. We now have four models of guns (Cupolinors) ranging from less than $1,000 to over $4,000, depending upon the speed of patching required. We have remote controls, "one-man" operation, high speed, low speed and every possible combination. Nowhere else can you find such a wide choice — and therefore meet your needs exactly.

We are also the world's most experienced producers of gun patching materials (like I said, we originated the process). Even here we have two "models." Cupoline is the original. It has maximum refractoriness, compaction and density for larger cupolas and high-temperature operations. Cupoline 77 is the newest of the gun patch materials. It is a low-rebound, high-fusion material with a higher alumina-silica ratio for shorter heats, smaller cupolas and maximum slag resistance. *Both* are carefully prepared, scientifically blended and manufactured products. You can depend upon them being the same, car after car, because we make them that way. May we help you to improve your contour?

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Foundry Developments

By EDWIN BREMER

Metallurgical Editor

Withstands Heat

NEW high-temperature alloy is reported to be performing successfully at temperatures up to 1750° F in jet engines. Developed by metallurgists of Stanford Research Institute, the alloy, known as WI-52, contains 13 per cent tungsten and is being used for turbine nozzle vanes in the Pratt & Whitney J-57 jet engine. It is claimed that the alloy gives more thrust per pound of engine, decreases fuel consumption and lengthens engine life.

Protective coatings of chromium and aluminum have been developed to offset the oxidation which occurs in the 1750° F range. Other possible uses of the alloy include hot tools for forming, furnace components, and brazing fixtures.

Graphite Formation

EXPERIMENTS have been carried out by W. Oldfield to determine whether normal coarse or fine graphite could be obtained by heat treating white cast iron.

Reported in the December, 1959, issue of the BCIRA *Journal of Research and Development* (Birmingham, England) in "The Origin of Flake Graphite Formed During High Temperature Heat Treatment of White Cast Iron," the results show that normal flake and undercooled graphite cannot form as the result of decomposition of cementite in the solid state; also that compact or quasi-flake graphite ensues from decomposition of eutectic carbide in the solid.

Heat treatment of ledeburite below its equilibrium freezing temperature results in a quasi-flake graphite structure not found in normal gray irons. Above this temperature but below the melting point of the iron-graphite eutectic, it is possible to detect in quenched specimens the melting of ledeburite and simultaneous formation of a normal graphite structure. The latter arises from solidification of molten eutectic originally ledeburite.

In the experiments, fine or undercooled graphite formed on heat treatment of ledeburite only in irons of very low sulfur content and again when melting had taken place. Results are considered to refute the theory that normal flake graphite structures can form in normal cast irons by solidification of white iron which subsequently decomposes in the solid state.

Reduces Handling

MULTIPLE handling of loose castings at Dalton Foundries Inc., Warsaw, Ind., has been transformed into a streamlined single handling

materials flow system with a new packaging and material handling program. Program saves considerable handling time not only in the foundry but also in the customers' plants.

The system employs large corrugated shipping containers stapled to expendable wooden pallets, which replace wooden boxes, metal barrels and burlap bags. Use of the containers begins in the grinding, cleaning, and finishing department where they are filled with castings and then taken by fork-lift trucks to storage areas, as shown in the accompanying illustration. When an order is completed the pallet-containers are taken from storage and loaded directly into the carrier.

Containers used at Dalton Foundries were developed by Mead Containers Div., Mead Corp., Toledo, O. Two sizes are used—36 x 36 x 24 in. and 18 x 18 x 24 in.—and hold 1000 to 3000 lb. Containers are doublewalled with a special corrugation medium to give the containers exceptional strength for handling heavy castings. The Dalton Foundries imprint on the containers serves as an identification and advertising medium.

Speeds Analysis

ALUMINUM and iron can be separated quickly by a new technique described in a report issued recently by the Office of Technical Services, U. S. Department of Commerce, Washington 25. Method is useful for determining aluminum in ferrous alloys in absence of nickel. Separation is achieved by the sodium hydroxide method. Aluminum is precipitated with 8-hydroxyquinoline and determined gravimetrically. Report is entitled "Rapid Separation and Gravimetric Determination of Aluminum in Ferrous Metals" by L. A. Keyser and C. D. Houston, and designated as PB 161003. Price is 50 cents.

Effect of Temperature

FURTHER investigation of effect of pouring temperature on sinking in bosses on gray iron castings is reported in "Sinking Under Bosses on Thin Plates" by A. G. Fuller in the October, 1959 issue of *BCIRA Journal of Research and Development* (Birmingham, England). At pouring temperatures over 1280° C the effect is governed by mold variables, and at low temperatures sinking is governed by the number of eutectic cells growing. With the type of irons studied, sinking is at a minimum when the temperature is within the range 1280 to 1330° C. As the pouring temperature is increased above or decreased below that range, the depth of sinking increases. It is probable that effects of pouring temperature will be modified by composition.

■ The direct-reading spectrometers at Bridgeport Brass Company plants are used for fast, accurate alloy composition analyses. These units, integrated with pneumatic sample tube systems, make possible complete quality-control analyses in a matter of minutes from the time the samples are taken until the reports are telautographed back to the melt floor.

Results—obtained quickly and economically by direct reading spectroscopy — permit Bridgeport Brass Company plants to maintain elements within alloy composition limits.

"NATIONAL" GRAPHITE helps speed alloy composition analyses

"National" graphite rod grades AGKS and SPK are being used for the analysis of 95 to 100% on all castings from furnaces at the Bridgeport Brass Company's copper base alloy and aluminum plants. Grade SPK, a newly introduced product, is providing excellent reproducibility and has cut running time approximately five hours/week on troublesome jobs. It is preferred on samples containing over 90% copper to provide hotter discharges which rapidly vaporize the metal, providing faster analyses. In addition, the improved texture and density offer better machinability and more "shots" per rod.

Whether you use rods, pre-forms or powders, specify "National" for your spectroscopic work.

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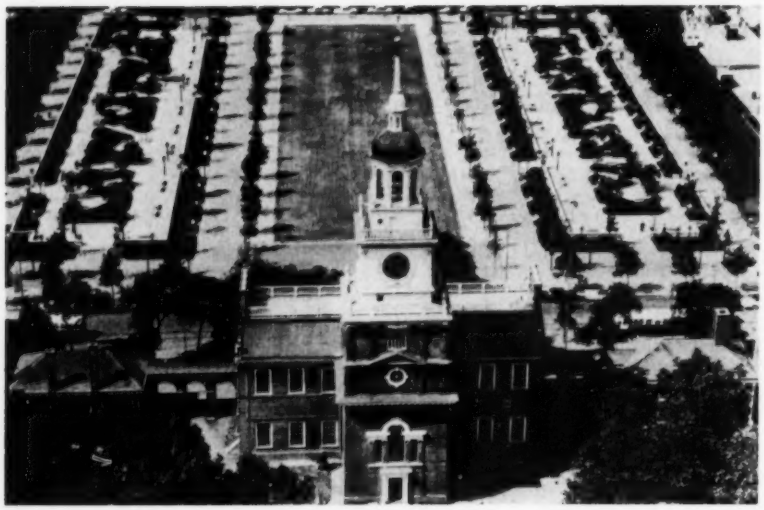


Independence Hall is a historical landmark in Philadelphia, site of the 64th AFS Castings Congress and Exposition, May 9-13, 1960

Plans Progressing for

AFS CONGRESS and EXPOSITION

● AS OF MARCH 1ST, the 64th AFS Castings Congress and Exposition is only 40 days in the future, and the foundry industry's mammoth convention and show is taking its final form. The 1960 assembly will be held May 9-13 at Convention Hall in Philadelphia.

To date, well over 200 exhibitors have signed up for the show of the latest in foundry equipment, supplies, and techniques. This display will be accompanied by a convention program (see tentative schedule below) which includes 38 technical sessions, 8 roundtable luncheons, and 6 off-the-record shop courses. These meetings will encompass a wide variety of topics of interest to both operating and management personnel in the foundry industry. The tentative, partial list of technical papers includes the following:

Inclusion Identification in Magnesium Alloy Castings; Parashrinkage Phenomena—Veining, Metal Penetration, Scabbing, Hot Tearing; Corrosion Fatigue in Two Hot Work Die Steels; Feeding Distance of Risers for Gray Iron Castings; Apparent Thermal Conductivity of Molding Sand at Elevated Temperatures; Microstructural Changes upon Tempering Nickel Chromium White Iron at 400° F; Impact Resistance of Nickel-Manganese Cast Steels.

Controlling Costs of Foundry Operations; Applicability of Shell Molded Test Bars to the Evaluation of Melt Quality of Tin Bronze Castings; Selected Principles of Soil Mechanics Related to Sand Testing, Molds, and Cores; Surface Defects on Shell Molded Castings; Effect of Casting Temperature on Aluminum Alloy Test Bar Properties; Density: Sand Grain Distribution Effect on Physical Properties; Heat Treatment of 4½ Per Cent Nickel Steel.

Growth of White Iron during Malleablizing; Solidification of Aluminum Casting Alloys; Formation of Dispersions in Molten Copper by Mechanical Mixing; Aluminum Alloy with High Silicon Content; New Aluminum Alloy for High Strength Castings; Molding Sand Control by Green Compression and Green Shear Strength Testing; Measurement versus Calculation of Solidification of Metal in Iron Molds; Effect of Variation of Some Physical and Chemical Conditions on Properties of Bentonite Suspensions.

Ultra High Pressure Casting; Job Evaluation—Asset or Liability; Factors Contributing to the Soundness of Titanium Castings; Short-Time Elevated Temperature Properties of

TENTATIVE PROGRAM

Monday, May 9

7:30 a.m.—Author-Chairman Breakfast
8:30 a.m.—Registration
9:30 a.m.—Technical Sessions: Brass and Bronze; Light Metals; Malleable; Pattern
12 noon—Round Table Luncheons: Light Metals; Malleable
2 p.m.—Technical Sessions: Pattern; Nonferrous Symposium
4 p.m.—Technical Session: Sand
8 p.m.—Shop Courses: Malleable; Sand

Tuesday, May 10

7:30 a.m.—Author-Chairman Breakfast
8:30 a.m.—Registration
9:30 a.m.—Technical Sessions: Brass and Bronze; Malleable; Pattern; Safety, Hygiene and Air Pollution
12 noon—Round Table Luncheons: Brass and Bronze; Pattern
2 p.m.—Technical Sessions: Education; Gray Iron; Industrial Engineering and Cost; Light Metals
4 p.m.—Technical Sessions: Gray Iron; Light Metals; Malleable; Sand
6 p.m.—Canadian Dinner; Sand Dinner
8 p.m.—Shop Courses: Gray Iron; Malleable

Wednesday, May 11

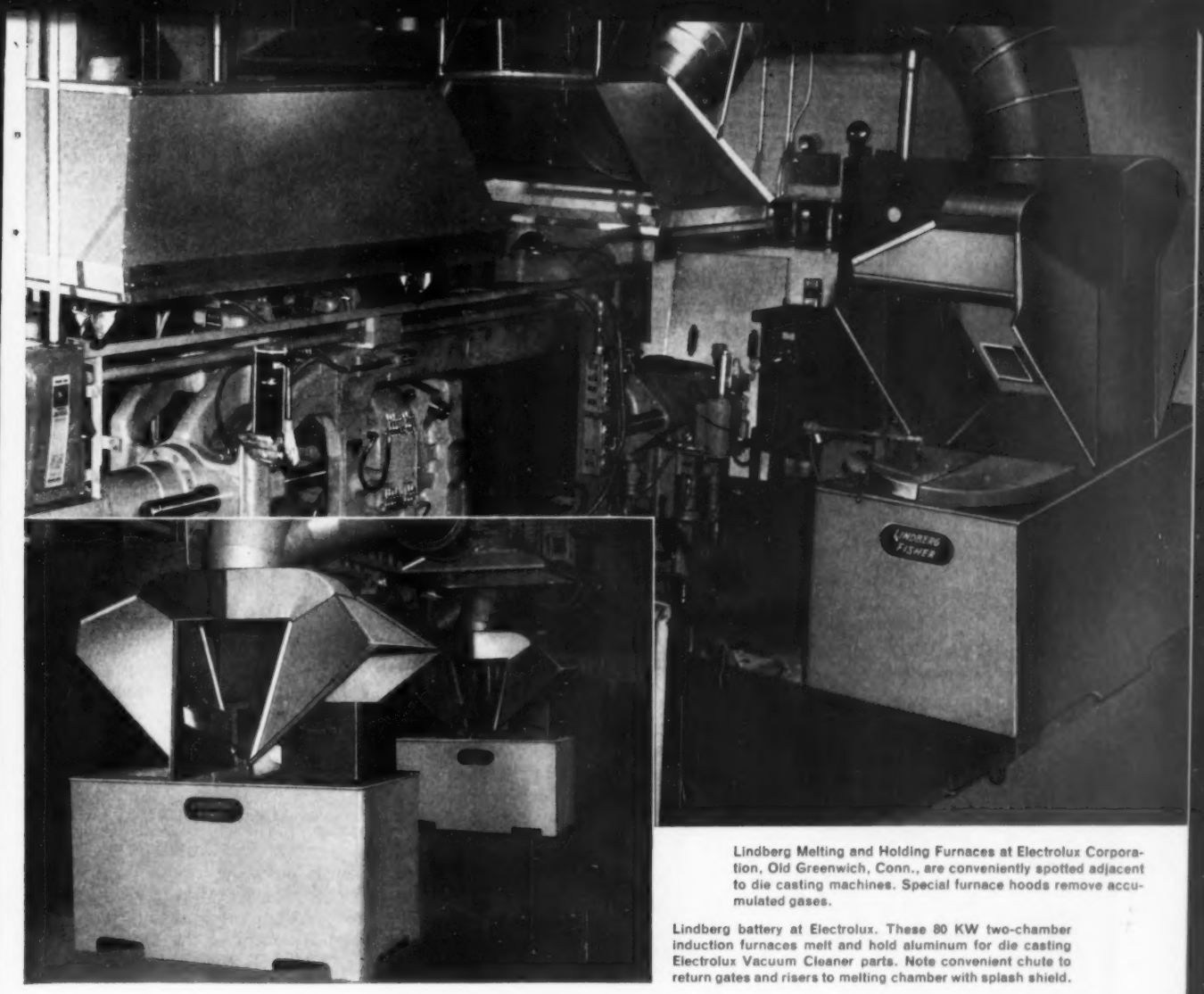
7:30 a.m.—Author-Chairman Breakfast
8:30 a.m.—Registration
9:30 a.m.—Annual Business Meeting and Annual Hoyt Lecture
12 noon—Round Table Luncheons: Diecasting and Permanent Mold; Management
2 p.m.—Technical Sessions: Diecasting and Permanent Mold; Gray Iron; Plant and Plant Equipment; Steel
4 p.m.—Technical Sessions: Diecasting and Permanent Mold; Industrial Engineering and Cost; Sand; Steel
7 p.m.—Annual AFS Banquet

Thursday, May 12

7:30 a.m.—Author-Chairman Breakfast
8:30 a.m.—Registration
9:30 a.m.—Technical Sessions: Diecasting and Permanent Mold; Ductile Iron; Fundamental Papers; Steel
12 noon—Round Table Luncheons: Ductile and Gray Iron; Steel
2 p.m.—Technical Sessions: Ductile Iron; Symposium on Solidification (Joint Heat Transfer and Fundamental Papers)
4 p.m.—Technical Sessions: Gray Iron; Sand; Steel
6 p.m.—AFS Alumni Dinner
8 p.m.—Shop Courses: Ductile Iron; Gray Iron

Friday, May 13

7:30 a.m.—Author-Chairman Breakfast
8:30 a.m.—Registration
9:30 a.m.—Technical Sessions: Ductile Iron; Fundamental Papers; Heat Transfer; Sand



Lindberg Melting and Holding Furnaces at Electrolux Corporation, Old Greenwich, Conn., are conveniently spotted adjacent to die casting machines. Special furnace hoods remove accumulated gases.

Lindberg battery at Electrolux. These 80 KW two-chamber induction furnaces melt and hold aluminum for die casting Electrolux Vacuum Cleaner parts. Note convenient chute to return gates and risers to melting chamber with splash shield.

LINDBERG MELT AND HOLD FURNACES HELP DIE CASTING EFFICIENCY AT ELECTROLUX

Recently, Electrolux Corporation, Old Greenwich, Conn., decided to die cast parts for the famous Electrolux Vacuum Cleaner in their own plant. To insure greatest efficiency and to provide the most ideal layout and working conditions Lindberg Two-Chamber Induction Melting and Holding Furnaces were selected to supply aluminum for the die casting machines. Electrolux has found Lindberg equipment to be completely reliable, ideal casting temperatures are easily maintained and the absence of noise and burner heat assures comfortable clean working areas. Operation has proved so satisfactory that two additional Lindberg furnaces have been purchased and are now being installed.

Wherever or however aluminum needs heat there is Lindberg equipment to apply it most economically and efficiently. Furnaces for melting and holding, casting stations, remelting or heat treating are available in all capacities, electric or fuel fired. See your Lindberg Field Representative (consult your classified phone directory) or write us direct. Lindberg-Fisher Division, Lindberg Engineering Company, 2453 West Hubbard Street, Chicago 12, Illinois. Los Angeles Plant: 11937 S. Regentview Ave., Downey, Calif. In Canada: Birlefco-Lindberg, Ltd., Toronto. *Also factories in:* Argentina, Australia, England, France, Germany, Italy, Japan, Scotland, South Africa, Spain and Switzerland.

Circle 633 on Page 53

LINDBERG heat for industry

Premium Quality Magnesium Castings; The Inherent Characteristics of Cast 70/30 Cupro-Nickel; Casting Loss Reduction Program; Survey of Canadian Nonferrous and Iron Foundry Sand Practice; Influence of Nickel up to 37 Per Cent and Silicon to 3 Per Cent on Eutectic Carbon Content of Cast Iron; Improvement of Properties of Aluminum Casting Alloys by Grain Refining.

Exhibit Open Daily—The exposition will consist of more than 100,000 sq ft of exhibits showing the most recent developments in equipment, processes, techniques, and supplies to the foundry industry. It will be open from 9 a.m. to 5:30 p.m. on Monday, Tuesday, and Thursday; from 11 a.m. to 5:30 p.m. on Wednesday, when the annual business meeting and Hoyt Lecture will precede its opening; and from 9 a.m. to 5 p.m. on Friday, the closing day. The annual banquet will be held on Wednesday evening.

Philadelphia Chapter of AFS will be host chapter for the event. General convention chairman is Clyde B. Jenni, General Steel Castings Corp., Eddystone, Pa.; Henry C. Winte, Florence Pipe Foundry & Machine Co., Florence, N. J., is general convention vice chairman. Secretary-treasurer is Herman E. Mandel, Pennsylvania Foundry Supply & Sand Co., Philadelphia.

Other committee chairmen include the following: Plant Visitation—Charles W. Mooney, Olney Foundry Div., Link-Belt Co., Philadelphia; Banquet—William J. Gallana, E. J. Lavino & Co., Philadelphia; Shop Course—Robert F. Schmidt, Ajax Metal Div., H. Kramer & Co., Philadelphia; Philadelphia Day—Edward C. Klank, Philadelphia Coke Co., Philadelphia; Ladies Entertainment—Robert C. Stokes, Crown Non-Ferrous Foundry Inc., Chester, Pa.; Reception—John M. Robb, Pennsylvania Foundry Supply & Sand Co., Philadelphia.

A NEW COST MANUAL

(NO. 2)

for the Gray Iron Castings Industry

Here in 120 carefully planned pages is a complete Cost Account System for both a small foundry with minimum accounting facilities and a large foundry capable of detailed cost determinations for accuracy and completeness.

Two cost manuals under one cover—Cost Manual No. 1, representing twenty years of editing and revising by practical operating experts in the industry, is included as a supplement.

Price $10.00 Postpaid

The more thorough treatment of the subject found in the new manual was dictated by the considerations of economy in dealing with the higher priced labor and material factors and a relentless desire to probe for hidden costs from wasteful and nonprofitable activities.

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Nominations Are Opened For 1960 ADCI Doehler Award

The American Die Casting Institute now is accepting nominations for the 1960 Doehler Award, which recognizes outstanding contributions to the advancement of the diecasting art.

The Award Committee will consider the following in the selection of the recipient: 1. Technical achievement as measured by significant scientific contributions of a metallurgical or engineering nature relating to the diecasting process. 2. Advancements in plant operations of a management or administrative nature and related to the operational phases of the industry. 3. Other activities, not primarily of a scientific or operational nature, which result in the enhancement of the reputation and acceptability of diecastings. An achievement in any of these classes must be generally applicable to the diecasting industry.

Nominations for the award, with supporting papers or other related material, should be submitted to the Award Committee, American Die Casting Institute, 366 Madison Ave., New York 17, N. Y., before April 15.

FOR WHITE
DIESEL ENGINE DIVISION
The WHITE MOTOR COMPANY
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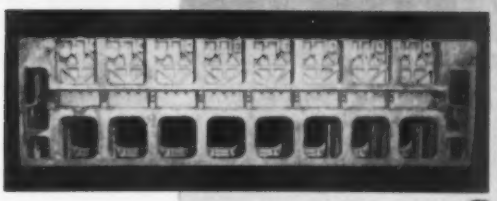

Better Castings LOWER COSTS

Comparison of Kold Set With Conventional Sand Cores		
	Number Required	Saving
CORE MAKING	358 Conventional Cores Required 174 Kold Set Cores Required	51% labor cost and 29½% material costs
Core ASSEMBLY	116 Conventional Cores Assemblies Required 161 Kold Set Cores Required (No Assemblies)	70% labor saving
CLEANING		11% Labor Saving

With Kold Set . . . 31% Saving in overall Costs

Excellent results are being achieved with Kold-Set cores at White Diesel Engine Division's modern foundry on 8-cylinder diesels. These castings for White Superior engines involve intricate structures, ribbing and a variety of section thicknesses.

"Improved weight-saving design has been greatly aided by use of Kold-Set to achieve good structure within close tolerances."

"... through use of Kold-Set, which gave a more favorable casting and better metal soundness."

INDIRECT PHASES

Core Knock Out		Core Baking
Kold Set Sand Cores Over Conventional Sand Cores	75% Labor Saving	80 hours Conventional (one set) 24 hours Kold Set (one set)

Kold-Set is Patented in the United States

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PRODUCTS FOR FOUNDRY PROGRESS
G. E. SMITH, INC.
246 Washington Road Pittsburgh 16, Pa.
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Circle 635 on Page 53

FOUNDRYMAN MARKETS

A combination of boyhood interest in casting and an appreciation of creative design led to the establishment of a profitable business in yellow brass ornamental hardware castings

● AN APPRECIATION of artistic and creative design and a boyhood interest in casting lead and white metal novelties provide the foundation on which Ralph DuBois has built a prospering ornamental hardware foundry in Tulsa, Okla.

During World War II, while serving in the U. S. Navy machine repair shops, Mr. DuBois collected ornamental objects from antique shops and visited foundries along the eastern seacoast. He developed the conviction that a demand existed for ornamental hardware. To substantiate that conviction, he purchased patternmaking and other foundry equipment from government surplus agencies. He was in business the day after his discharge from the Navy.

The first casting was a door knocker decorated with the traditional American Eagle. Donning his sales cap, Mr. DuBois, who acts as foundryman-marketer-salesman, took the knocker to one of the finest gift shops in Tulsa. He sold it to the owner and walked out of the shop with an order for five more. Repeat orders and custom hardware jobs secured from local decorators sustained the business as standard ornamental hardware lines were developed and the customer list broadened for standard and made-to-order items.

Buyers of the hardware discovered that their customers desired the ornamental pieces for their originality and beauty and were pleased with the satisfactory operation of the equipment. Beauty was coupled with functionalism. The foundry makes every effort to develop satisfaction through high-quality workmanship and the best possible service.

Today, as in the past, all inquiries about cast hardware are answered the same day they are received. In each instance, a photographic catalog of 1000 standard patterns is sent out with a price list and simplified order forms. Actually the company has 9000 patterns on hand. Many are for made-to-order items; others are for unusual castings of limited interest. When an order is received, the job is processed and completed generally in less than two weeks.

This is a small foundry, having only two employees in addition to the owner. The employees are apprentice-trained, top-grade craftsmen. They have the interest, ability, and experience necessary to produce the ornamental castings in which the DuBois foundry specializes. Annual castings production accounts for about 5 tons of yellow brass.

Master casting patterns are modeled in clay or carved in plaster. Sometimes natural materials such as sea shells or other objects are used. Often a combination of materials is employed to get the proper pattern design. Generally a production aluminum pattern is cast from the master. In some cases, however, a few molds are made from the master and castings poured to make certain that the pattern will give the desired result. Also, if the job calls for one or only a few castings, no production pattern is made.

Most molding work is done with loose patterns, and often a match of sodium silicate-bonded, CO_2-cured sand is used to support irregularly-shaped patterns while the drag is rammed. Experience indicates that a match of that sand can be made quickly and provides firm support for the pattern.

Molding sand mixes consist of AFS McConnellsville silica sand with a special bonding agent in the presence of oil. No water is used. Molds are poured with yellow brass —70 per cent copper and 30 per

Cherubs on faucets and spouts are typical of DuBois ornamental castings. The foundry has a total of about 9000 patterns available

AN IDEA

cent zinc.

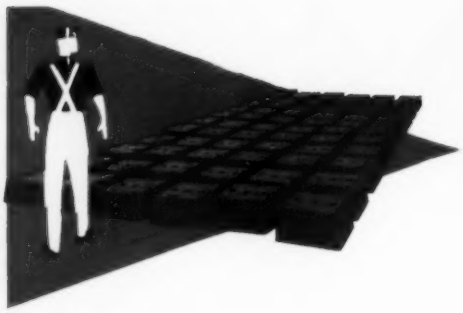
Finishing includes sanding and careful fabrication of workable mechanical parts. Each unit must be functional. The hardware is polished or given an oxidized finish. It also may be plated in gold, silver, copper, or chromium. Tanks and other equipment at the foundry permit the plating of pieces up to 6 ft long.

The company's business continues to grow as a result of Mr. DuBois' promotional activities on visits to principal cities throughout the country. Increased business has made expansion of the foundry necessary. Currently, a new building is under construction on the Tulsa bypass highway. It will house a new foundry and showrooms. The expanded foundry operation will include facilities for producing castings by the investment molding process in addition to currently used molding methods.

Foundry worker Von Dale Carpenter, left, and owner, Ralph DuBois, right. Carpenter holds a plaster master pattern and aluminum production pattern for a spout. DuBois is carving a plaster master pattern for a spout

Molder W. I. Morgan is cutting a runner in the drag half of a mold. Most of the molding is done with loose patterns

Hardware is polished or given an oxidized finish. It also may be plated



MOLDS ON THE MOVE MAKE MONEY...

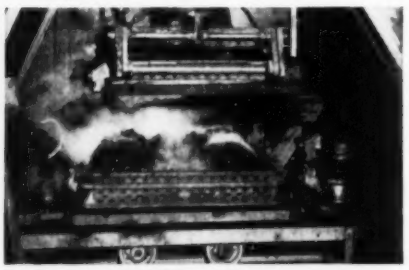
Automation by Newaygo keeps molds on the move

The trend today in progressive foundries is to automation. The goal is "more molds with fewer motions." The increasingly high cost of labor and materials clearly indicates to foundry operators that if profits are to be made and maintained they must look to the most efficient and economical methods of sand and mold handling and conditioning for their foundries.

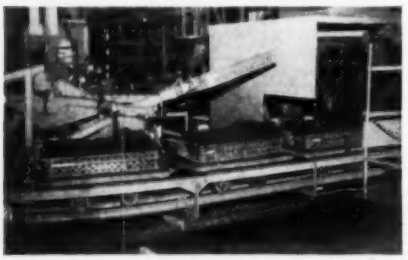
Newaygo Engineering Co., one of the foremost specialists in designing and manufacturing automated foundry equipment, can give you the same expert experience and service they render to many others regarding foundry automation.

Newaygo specializes in designing and manufacturing automated foundry equipment for mold setting, closing, shakeout and flask and casting handling. Each job is engineered to fit the particular requirements of the foundry for which it is made. Building limitations, floor dimensions and existing machinery are considered and all equipment is put to the best use.

Cope and drag are joined at this point on an automatic Newaygo Car Conveyor Line. Molds are continuous poured as they travel by on the conveyor.

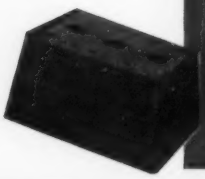


Cope shakeout station automatically removes and shakes out cope section of the flask. Complete automation cycle includes vibrating of cope flasks for excess sand removal and delivery of them into the automatic molding machine.



Showing automatic drag shakeout and flask handling as well as the automatic return of the drag flask into the automatic molding machine. Note the rugged construction of the Newaygo Car Conveyor as well as the hydraulic flask turnover.

Large mold being dumped by automation onto an Oscillating Conveyor below. This automatic shakeout feature allows dumping from one to five molds simultaneously. Bottom board and pallet are automatically returned to the molder.



Let us show you how we can "keep the molds moving in your foundry". Write today for your copy of BULLETIN 56,— with its thirty-two pages of modern, efficient foundry equipment that will pay for itself in your foundry. And BULLETIN 60 on "Newaygo's Pallet Line Systems of Mold Handling" will help you.

Newaygo MOVIES are yours for the asking

"PROGRESSIVE MECHANIZATION," a 16mm, 33-minute movie shows Newaygo equipment in nine foundries. "NEWAYGO PALLET SYSTEMS FOR MOLD HANDLING," another 16mm. 25-minute movie, presents many types of Pallet Line installations in foundries.

"Foundry Business is **BIG** BUSINESS . . ."

NEWAYGO engineering company
NEWAYGO, MICHIGAN

. . . and profitable, too, with NEWAYGO MOLD HANDLING, SAND HANDLING AND CONDITIONING EQUIPMENT

Also Manufacturers and Installers of ELECTRA-LEVEL HOPPER CONTROL SYSTEMS, CAR CONVEYORS, APRON CONVEYORS, ROTARY FEEDERS and FOUNDRY APPLICATION

Man to Man

By RALPH L. LEE, *President*

Lee Hobby Foundry
Birmingham, Mich.

"It seems to me that cupolas are like women. When you begin to think you understand them, you find out definitely that you don't"

Cupola Capers

● IT'S GETTING so nowadays that when I come abreast of a full-fleged, bang-up, A-No. 1 cupola operator, I instinctively come to attention, click my heels together, and salute. If I don't watch myself, I'm likely even to genuflect or curtsy. For I believe that of all of the indispensable, wonderful, ornery, temperamental, and unpredictable pieces of apparatus mankind has been permitted to concoct, that mud-lined smokestack called the cupola heads the list. They're just like women: When you begin to think you understand them, you find out definitely that you don't. What's more you discover that neither one of them wants to be understood.

What amazes me—after close onto twenty years trying to learn how to run the little Lee Hobby Foundry stack, attending sessions on the subject at our foundry meetings, and reading everything I can get on the subject—is how in the name of Heaven all the foundries manage to melt and pour the millions of tons they do every year.

Small Stacks a Problem—Of one thing I'm firmly convinced: The difficulty of operating a cupola increases as the bore shrinks—not directly, but as the square or cube. And it might well be that in my case—with a 10-incher, and me the only employee, serving as molder, charger, melter and pourer—a higher power is likely to be in order.

I'll tell you that the old amateur sure is moving in high gear when the time comes to tap (no one to hold the ladle), bott, struggle out to the floor, and pour with no one to skim for me. But the truth of the matter is that I love every bit of it. There's just something about it—I don't care what anybody says.

Maybe it's the very unpredictability and the never-ending challenge that makes the melting of iron (particularly) sort of a game that gets into your blood and keeps you at it in spite of the grumbles and groaning. Now you take a job we had some months back.

A Melt That Went Wrong—I had a floor of molds—each one enclosing a setup of intricate and difficult-to-make cores—all set, with weights in place, ready to pour. With two previous heats of good iron to give me courage and a song in my heart, I tapped off, panted on out with just about all the iron I could carry, and poured off.

A cupola is like a woman

I was proud of the molds and could hardly wait to shake them out to see what I got. And doggone my britches, if I didn't find that my iron was just a teeny bit too cool to fill those molds—not much you understand, but just enough to make every darned one of them scrap. All that work. Boy!

Although I don't have an optical pyrometer, I would have sworn that the heat of iron that failed me was just as hot as the two previous heats, which turned out all good castings, but another breed. I imagine that things like this happen mostly to amateurs.

Now the scene shifts. The night after Christmas, with my son Ralph, his good wife, and the grandson (molder material) standing by, I tapped another heat and poured another floor. Every one of the molds was a good one, with the metal so hot that it drained the ladle dry. Maybe the fact that the castings were tardy Christmas presents had something to do with my success, but I doubt it. In fact, I know it, for I had done something to the cupola beforehand.

Needed More Air—I had known

for years that I didn't have enough pressure on the windbox or enough air to melt with, even though I had managed to get by (after a fashion, that is). So I bought me a new motor for the blower, twice as big as the old one, then faced the problem of whether the handmade blower would take it. I could picture that poor old impeller giving up the ghost and flying through the casing. But it didn't. In fact, it ran quieter under full load than it had before.

Then, with a feeling that everything was set, I received a jolt. My manometer and anemometer proved that all this new abundance of air wasn't getting through the coke bed. Trying to find out where the heck it was going, I discovered that the windbox was full of leaks, as were the connecting pipe to the blower and the blower housing itself.

Every thing is airtight now. I don't use as much stone as I did before, because with small-sized coke it caused bridging. I bott from the inside on the first blast-on. The ladle now is insulated, and the lid too. Oh, and I brought the breast out closer to the shell. Since my cupola is hinged just above the melting zone, I don't drop the bottom any more. I let the coke burn out.

How About You?—I'm sure that this rambling account of the trials and tribulations of the old amateur cupola man for the Lee Hobby Foundry is just baby stuff to all of you A-No. 1 experts. On the other hand, however, you could have some leaks in your blast system.

I just can't help feel that without getting technical or metallurgical one tiny bit, quite a few common, ordinary, easy-to-understand things could be going on around the cupola that might be looked into. I'm going right on snapping to attention when I meet up with folks who know how to deliver the right kind or iron, at the right temperature, at the right time, and in the right quantities. They deserve to be recognized. In fact, from what I've seen, they frequently deserve more recognition than they get.

Industrial Gas Cleaning Institute Inc. Is Formed

The Industrial Gas Cleaning Institute Inc. has been formed by representatives of manufacturers of gas cleaning equipment to promote their interests, improve trade practices, and to perfect standards of design, operation, and testing of gas cleaning equipment.

The group has elected John T. Doyle, Thermix Corp., Greenwich, Conn., as its first president. Other officers are L. L. Andrus, Wheelabrator Corp., Mishawaka, Ind., vice president, and John G. Liskow, American Air Filter Co., Louisville, Ky., treasurer and temporary secretary.

Original members include American Standard-American Blower Co., Aerotec Industries, American Air Filter Co., Buell Engineering Co., Ducon Co., Joy Mfg. Co., Kirk & Blum Mfg. Co., Koppers Co., Northern Blower Co., National Dust Collector, Pangborn Corp., Pulverizing Machine Div. of Peabody Engineering Corp., Research-Cottrell Inc., Thermix Corp., Torit Mfg. Co., Western Precipitation Corp., Wheelabrator Corp., and Green Fuel Economizer Co.

POWERING

with Curtis compressors

DEPENDABILITY

DICTATES USE IN VITAL APPLICATION

New facility acts as high-speed communications headquarters for metropolitan fire and disaster control.

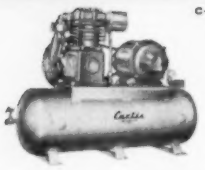
Architects: Hellmuth, Obata & Kassabaum

Consulting Engineer: John O. Falvey

NEW FIRE ALARM CENTER IN ST. LOUIS SELECTS CURTIS EQUIPMENT "TO RING THE BELL"

C-119

Curtis air compressors were selected for two different jobs in this just-completed "nerve center." By pressurizing cables that contain 1,172 miles of underground telephone and telegraph circuits, communications are protected against water or other damage. Another Curtis compressor powers eight cleaning jets located at key points inside the Center.



Full line of compressors available 1/4 to 50 H.P.

Your applications different? Probably—but the rugged dependability of Curtis compressors is the point that applies to **your** operations, too. All tanks meet ASME specification: units have Curtis-Seal Crankcase, Adjustable Timken Tapered Roller Main Bearings, Self Centro-Ring Oiling, Air Cooling (no cooling water required). Write for Free Catalogs covering the complete Curtis line.

THE COMPLETE LINE OF HORIZONTAL AND VERTICAL COMPRESSORS • AIR CYLINDERS • PENDANT AIR HOISTS

Curtis

MANUFACTURING COMPANY

PNEUMATIC DIVISION • *DEPT. 42, ST. LOUIS 33, Mo.* • *Established in 1854*

HIGH IN CARBON
MILWAUKEE
COKE
SOLVAY
MILWAUKEE
SOLVAY
COKE
Since 1904 a standard of value. Consistently uniform in size and in structure . . . Made of carefully selected coals of superior quality . . . Always in dependable supply. In brief, your best buy in coke.
LOW IN ASH
PM
PICKANDS MATHER & CO.
Cleveland 14, Ohio
Chicago • Cincinnati • Detroit
Duluth • Erie • Greensboro • Indianapolis
New York • Pittsburgh • St. Louis
Washington
IRON ORE • PIG IRON • COAL
COKE • FERROALLOYS • LAKE FUELING
LAKE SHIPPING

Circle 638 on Page 53

Sand brought into Cleveland by lake steamers later is taken to the foundry by rail

HANDLING SAND

. . . 325,000 Tons a Year

D9 tractor is used to clear the dock for sand deliveries and to move the sand within reach of clamshell which loads it into hopper cars

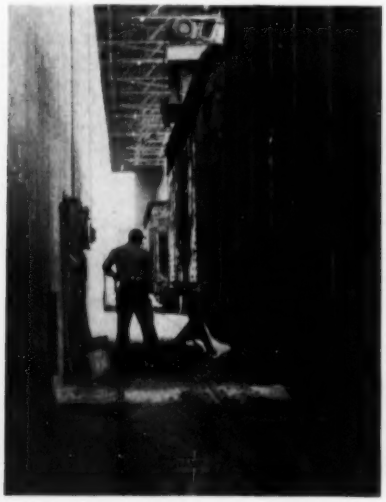
● A DESERT of sand grows each year in the heart of Cleveland.

In the area known as "the flats," over 325,000 tons of sharp Lake Michigan sand is delivered by lake steamers during the April-November navigation season. It is used as core sand at the Ford Motor Co.'s foundry in Brookpark, just southwest of Cleveland.

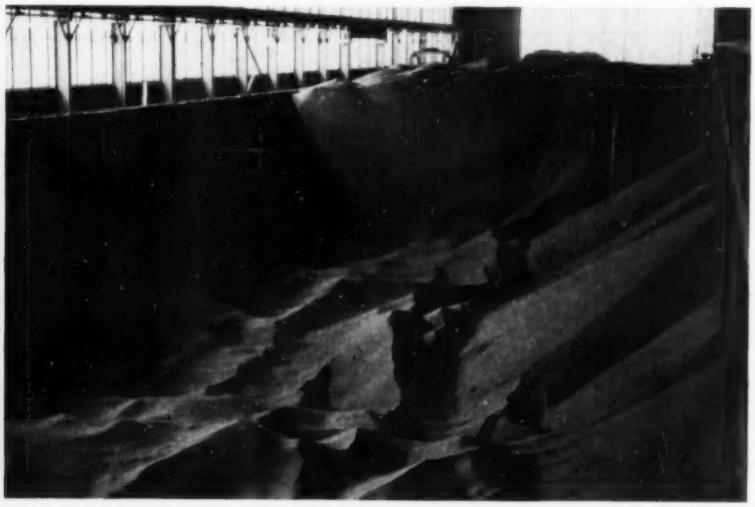
Despite the scope of the operation, only two machines are needed at the dock—a Northwest 2½-yard clamshell crane and a big Caterpillar D9 tractor. The latter moves the sand twice before it is sent to the foundry—once to clear the dock for the next boatload and again to bring the sand within reach of the clamshell for loading into hopper cars. So actually the tractor moves 650,000 tons of sand a year. In addition, 10,000 tons of limestone, used as a fluxing agent, is stockpiled by the D9.

The sand is unloaded at the dock

Sand is unloaded from bottom-dump cars through a grizzly



Dried sand is stored under cover in this giant, concrete bin. As it is needed, the sand is fed to the sand mullers by conveyors and elevators



Write for Bulletin No. 53-CM.

keep your quality in circulation

Skilled workmanship in the core room is wasted if oven heat isn't properly circulated and rigidly controlled. That's why control experts in the nation's largest foundries depend on Carl Mayer Core and Mold Ovens.

Your temper and temperature are always controlled with Carl Mayer Vertical Ovens. The heat recirculation system includes a sealed combustion chamber that keeps gases from prematurely escaping into the load area. Cores are evenly baked, and burning is eliminated.

Installation costs are sharply reduced, heat loss is minimized. For higher operating efficiency, greater production economy . . . Carl Mayer Vertical Ovens.

Experience in engineering, designing and installing industrial ovens and furnaces in both large and small industries everywhere.

THE **carl mayer** CORP.

20800 CENTER RIDGE ROAD CLEVELAND 16, OHIO

OTHER PRODUCTS: Heat Treating Ovens and Furnaces • Rod Bakers • Welding Rod Ovens • Paint and Ceramic Drying Ovens • Special Processing Equipment and Accessories

Circle 639 on Page 53

in 10,000-ton quantities. The material forms a cone-shaped pile 35 to 40 ft high and 90 to 100 ft wide at the base. Angle of repose is about 45°. Rather than bulldoze from the side of the pile, with possible undue wear on steering clutches, the machine walks up the slope and backblades the sand into benches.

The 320-horsepower machine is specially equipped with a hydraulically-operated No. 9 straight bulldozer. Thus, its hydraulic rams exert sufficient downward pressure to provide a sizable load when backblading.

Once benched, the sand is slot-dozed into a stockpile on the 14-acre site. By the end of the navigation season, the stockpiled sand covers an area of approximately 122,000 sq ft and reaches a level height of 20 to 40 ft.

The sand is transported to the Ford foundry 12 miles away by 75-ton capacity hopper cars. At the foundry the bottom-dump cars are unloaded by a Hewitt-Robins car shaker, which sends damp sand falling through a grizzly. The sand, which has a moisture content of 2½ to 7½ per cent, is conveyed to a charging bin. There it is screw-fed to one of two 30-ton Bartlett & Snow rotary dryers, where the sand is heated to about 500° F. A moisture content of one-half of 1 per cent is maintained as a standard for controlled mixing.

A 1200-foot belt conveyor system transports the dried sand to a concrete storage bin with a capacity of 34,000 tons. When needed, the sand is fed by belt conveyors and elevators to sand mullers, where it is mixed with binders and water before being delivered to the coremaking machines.

PROVIDES LONGER LIFE–NO HOT SPOTS

Acme melting pots and ingot molds assure even heat distribution without hot spots . . . they improve non-ferrous casting quality and put a damper on rejects. Cast of a specially developed iron alloy, Acme pots and molds provide great strength and unusual resistance to high temperatures, too. As a result they consistently reduce down time and substantially cut replacement costs.

Stocked in forty sizes and a complete range of styles, you can standardize on Acme melting pots and molds and be confident of immediate shipment at all times! Take advantage of all these benefits . . . proven over a period of more than 30 years.

★ **FORTY SIZES IN STOCK**

Quick delivery anywhere in the United States eliminates your "stand-by" non-ferrous pot and mold inventory. Write for bulletin listing all sizes and styles.

Acme FOUNDRY CO.

2502 22nd St. • DETROIT 16, MICH. • Phone TA 5-2404

Semiannual Meeting Held by Malleable Founders Society

Semiannual meeting of the Malleable Founders Society was held at Cleveland, Jan. 15. In addition to staff reports on the background of the society's business forecasts and publicity program, two featured speakers appeared on the program for the meeting.

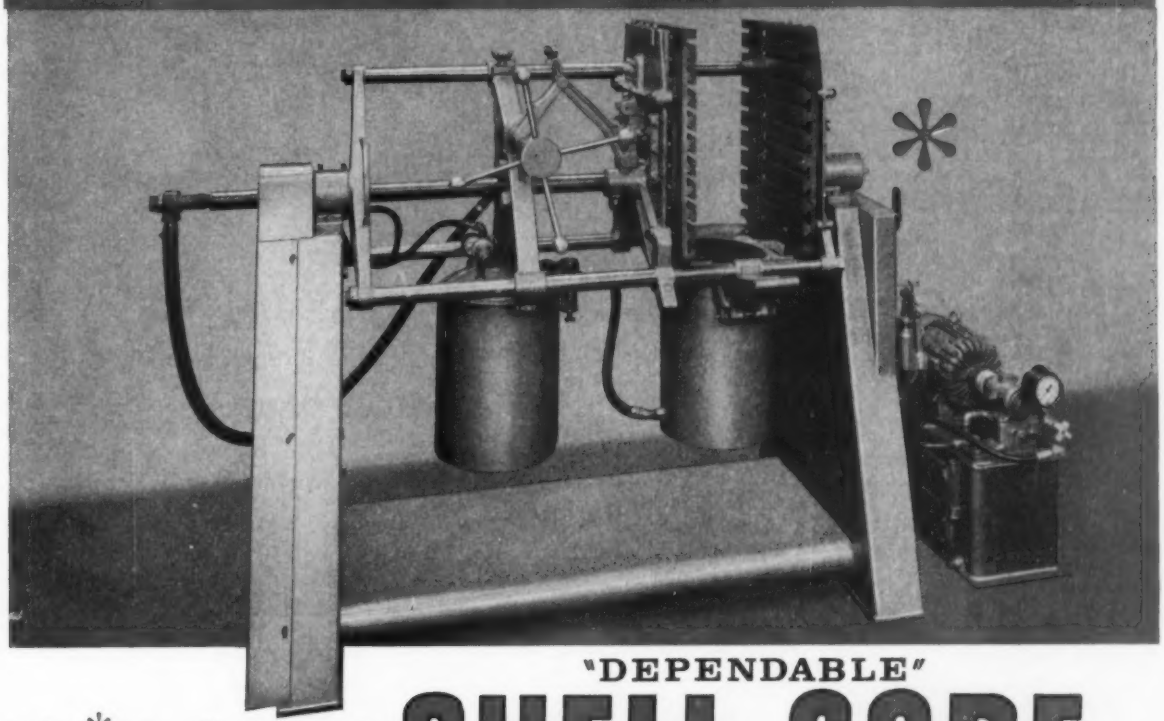
Problems connected with adequate staffing of the executive ranks in foundries were discussed by Harry E. Figgee, partner, Booz, Allen & Hamilton.

Mr. Figgee pointed out that the average age of foundry management individuals is relatively high—34 per cent of them have 30 or more years of service. This situation intensifies the need for training and upgrading younger men to fill top positions.

The outlook for American exports of many manufactured items is poor because U. S. goods are overpriced in world markets, according to O. B. Strackbein, chairman, the Nation-Wide Committee on Export-Import Policy. Attempts to cut costs by establishing plants abroad also have the harmful effect of curtailing the market opportunities for American raw materials.

Mr. Strackbein expressed disapproval of the influence of the State Department in the establishment of import quotas and duties, and urged passage of legislation that would make recommendations of the Tariff Commission mandatory unless overridden by Congress.

it's NEW... and BIG*



the* Model 400 "DEPENDABLE" SHELL CORE MACHINE

The new Model 400 shell core machine is hydraulically powered for fast, semi-automatic production of the largest shell cores. With a single control lever the operator can roll, invest, rock and drain all coreboxes speedily and with ease. The new model has a sectional type manifold, and will produce many cores of various lengths in less than a minute production cycle.

The large capacity sand tank is equipped with a self-sealing gasket for higher blow pressures. Face plates, 20" x 25¾" "T" slotted, allow large coreboxes to be used and easily changed with minimum shutdown. Auxiliary outlets facilitate using boxes wider or longer than the face plate dimensions.

Uses natural or manufactured gas heat, applied directly to the corebox, resulting in fast, economical core production. The Model 400 heat capacity is up to 330,000 B.T.U.'s per hour.

The sectional type manifold, controlled by individual valves, eliminates the necessity of operating all the burner tips if not required, thereby allowing the shorter length boxes to be used without heating the entire area of the face plate capacity.

All of these features give the operator full control of the heating system. Also, the large handwheel with ball bearing rollers on the cage and adjustable lever arm permits easy manual carriage operation for removal of cores from large, heavy coreboxes.

The hydraulic power unit can be located beside or away from the machine. The entire hydraulic system is simply designed to give trouble-free service. It operates on low hydraulic pressure with an adjustable speed feature.

Dependable Shell Core Machines Inc. produces four models: 100, 100-S, 200 and 400. Each will produce cores adaptable to any method of foundry practice—ferrous and non-ferrous, conventional, shell or permanent molds. Each machine is shipped completely equipped and assembled, ready to operate. No elaborate pits, foundations, or hold-down bolts are necessary.

The new Model 400 will be on exhibit at the AFS show in Philadelphia, May 9-13.

Manufactured by

DEPENDABLE SHELL CORE MACHINES INC.

1634 S. E. 7th Avenue, Portland 14, Oregon • BE 4-7565

For further information contact any dealer listed below

Barker Foundry Supply Co.
South San Francisco, Calif.

Barker Foundry Supply Co.
Los Angeles, California

Brandt Equip. & Supply Co.
Houston 21, Texas

Canfield Fdry. Sup. & Equip.
Kansas City, Kansas

Fischer Supply Co.
Chattanooga, Tenn.

Frank H. Jefferson, Inc.
Seattle 4, Washington

Great Western Chemical Co.
Spokane, Washington

La Grand Industrial Sup. Co.
Portland 1, Oregon

Smith-Sharpe Co.
Minneapolis 14, Minn.

Snyder Foundry Supply Co.
Los Angeles 58, California

Frederic B. Stevens, Inc.
Detroit 16, Michigan

Bruce & Conreaux
Indianapolis 19, Indiana

Penn. Fdry. Sup. & Sand Co.
Philadelphia 24, Penn.

St. Louis Coke & Foundry Sup.
St. Louis 10, Missouri

Shallway International Corp.
Flushing 58, New York

Sierra Foundry Supply Co.
San Gabriel, California

W. O. McMahon
Birmingham 9, Alabama

Pacific Graphite Co., Inc.
Oakland 8, California
Los Angeles 22, California

Utah Foundry Supply Co.
Salt Lake City, Utah

Circle 641 on Page 53

Literature for Foundrymen

For More Information Use Reply Card—Page 53

Air Sampling Techniques

Manual No. 2 contains technical information on air sampling techniques as reprinted from "Air Engineering," July, 1959.—**Gelman Instrument Co.**, P. O. Box 86, Chelsea, Mich.

For More Details Circle No. 454—Page 53

Safety Posters

Sixteen safety posters illustrate how accidents involving fork trucks occur and how to prevent them. Posters are 11 x 17 in.—**Automatic Transportation Co.**, 149 W. 87th St., Chicago, Ill.

For More Details Circle No. 455—Page 53

Suspension Scale

Model P suspension scale is described and illustrated in Bulletin 58E. Pertinent dimension and price data are enclosed.—**W. C. Dillon & Co. Inc.**, P.O. Box 3008, Van Nuys, Calif.

For More Details Circle No. 456—Page 53

Hoisting Equipment

Bulletin 1159 provides descriptions and dimensional data on company's hoisting equipment.—**Philadelphia Hoist Div., Industrial Enterprises Inc.**, Doyle and Hamilton Streets, Doylestown, Pa.

For More Details Circle No. 457—Page 53

Heat Fans

Bulletin HF-100 contains 20 pages of technical information on heat fans. Booklet includes engineering data, fan performance laws, air density ratios, altitude and temperature correction factors, and capacity tables. — **General Blower Co.**, 8618 Ferris Ave., Morton Grove, Ill.

For More Details Circle No. 458—Page 53

Fabric Filter Bags

Four-page folder MGB-100, "The Modern Solution to Fume and Dust Filtration Problems," describes Maco-Glas fabric filter bags. Applications of the bags in various industries are outlined.—**Menardi & Co.**, 1222 E. Grand Ave., El Segundo, Calif.

For More Details Circle No. 459—Page 53

Alloy Product Directory

Bulletin No. 11 contains detailed information concerning beryllium alloys and others including beryllium copper, phosphor bronze, nickel silver, brass, stainless steel, casting alloy ingot, master alloy ingot, billets, and heavy strip, bar, and plate.—**Brush Beryllium Co., Penrold Div.**, 501 Crescent Ave., Reading, Pa.

For More Details Circle No. 460—Page 53

Grinders, Polishers, Buffers

Catalog 75 contains illustrations and descriptions of backstands, dust collectors, abrasive belt and wheel grinding, polishing, and buffing machinery—**Hammond Machinery Builders Inc.**, 1600 Douglas Ave., Kalamazoo, Mich.

For More Details Circle No. 461—Page 53

Induction Motors

Bulletin 210 contains descriptions and illustrations of high speed, squirrel cage induction motors. Ventilation system, insulation materials, bearings, and rotor and stator assemblies are described. — **Ideal Electric & Mfg. Co.**, Mansfield 33, Ohio.

For More Details Circle No. 462—Page 53

Thermocouples

Illustrated Brochure 101 describes metallic sheathed, hard packed, oxide insulated thermocouples, and extension wire. Optional fittings and prices are given.—**Research Instruments Inc.**, 12410 Triskett Rd., Cleveland 11, Ohio.

For More Details Circle No. 463—Page 53

Data Processing Equipment

Preliminary Technical Publication N-07 (1) illustrates and describes data processing equipment in use, including analog and digital computing systems.—**Leeds & Northrup Co.**, 4934 Stenton Ave., Philadelphia 44, Pa.

For More Details Circle No. 464—Page 53

Did You Miss These?

Here is a list of popular literature items offered in recent months:

ULTRASONIC CLEANING—National Ultrasonic Corp., Irvington 11, N. J. Circle 450, Page 53

BARREL FINISHING (Booklet A1525) —Carborundum Co., Advertising Branch, Niagara Falls, N. Y. Circle 451, Page 53

FOUNDRY SUPPLIES (Catalog 460) — Federal Foundry Supply Div., Archer-Daniels-Midland Co., Cleveland 2, Ohio. Circle 452, Page 53

BLAST CLEANING ("Facts of Life Concerning the Use of Shot and Grit")—National Metal Abrasive Co., Cleveland 11, Ohio. Circle 453, Page 53

Molecular Bonding Process

Brochure describes a molecular bonding process which bonds ferrous components into aluminum castings.—**Arthur Tickle Engineering Works**, 21 Delevan St., Brooklyn 31, N. Y.

For More Details Circle No. 465—Page 53

Laboratory

Outline of the facilities and activities of the company is contained in booklet.—**Spectrochemical Laboratories Inc.**, P. O. Box 8781, Pittsburgh 21, Pa.

For More Details Circle No. 466—Page 53

Diecasting Machine

Four-page bulletin provides specifications and illustrations of 1000-ton cold chamber diecasting machine for aluminum castings up to 40 lb.—**Lester-Phoenix Inc.**, 2711 Church Ave., Dept. N-14, Cleveland 14, Ohio.

For More Details Circle No. 467—Page 53

Control Valves

Digest Catalog contains general descriptive information and dimensions of company's control valves. Specifications are provided.—**Ross Operating Valve Co.**, 120 E. Golden Gate, Detroit 3, Mich.

For More Details Circle No. 468—Page 53

Testing Machines

Booklet provides descriptions and illustrations of various testing machines. Company's sales representatives are listed. —**Steel City Testing Machines Inc.**, 8817 Lyndon Ave., Detroit 38, Mich.

For More Details Circle No. 469—Page 53

Dumpers

Multi-Purpose dumpers are illustrated in Catalog 59. General descriptions and features of each unit are included.—**Essex Conveyors Inc.**, 101 Colden St., Newark 3, N. J.

For More Details Circle No. 470—Page 53

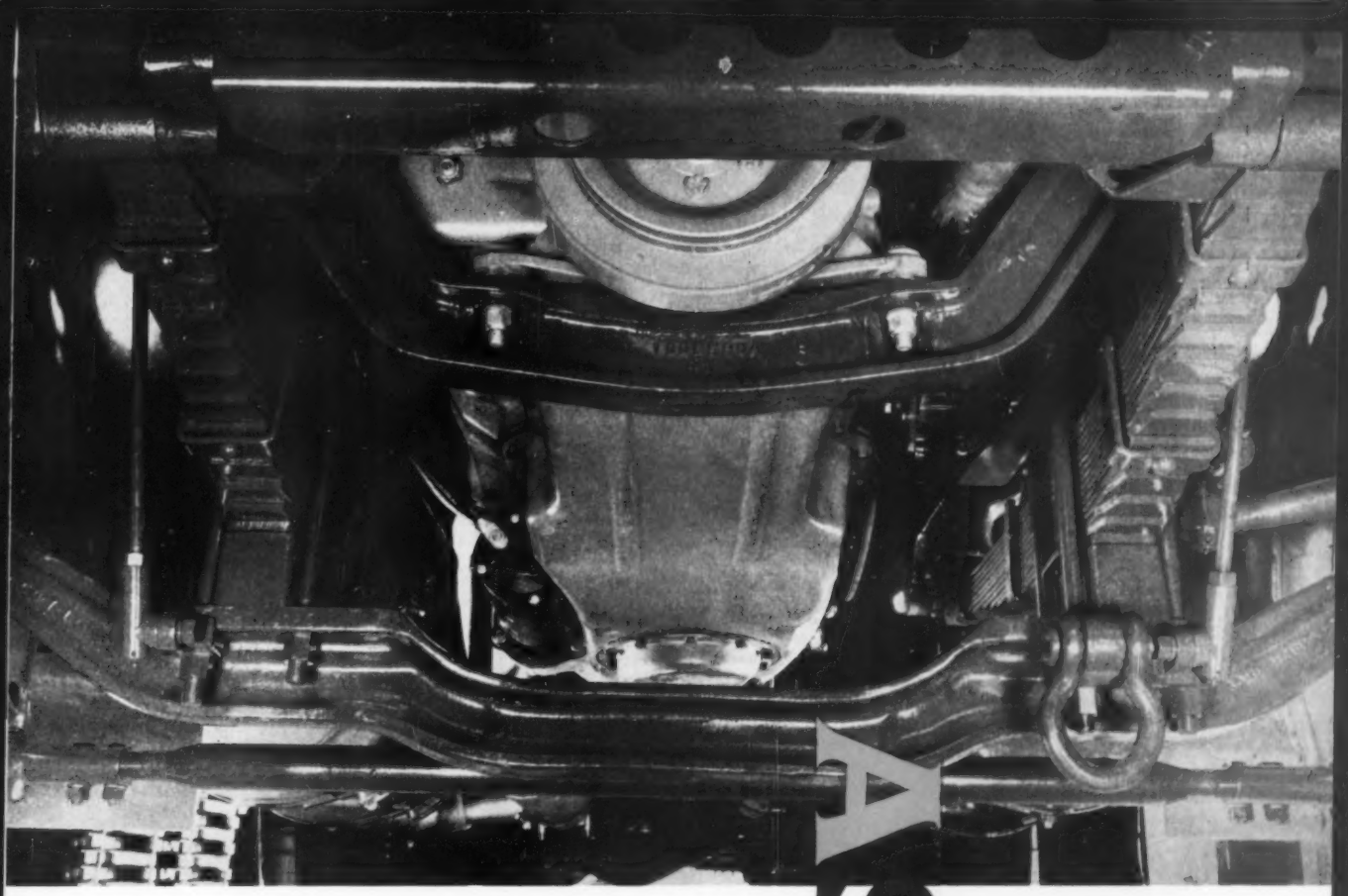
Mounted Wheels

Features of mounted wheels are described in Bulletin PG-358. Bulletin contains a chart showing all standard shapes and sizes of mounted wheels.—**Cincinnati Milling Products Div., Cincinnati Milling & Grinding Machines Inc.**, 4701 Marburg Ave., Cincinnati 9, Ohio.

For More Details Circle No. 471—Page 53

Level-Indicating System

Bulletin E-200 illustrates and describes applications and operation of Sen-Tek light-sensing, level-indicating system. —



Tenzaloy frame supporting front of heavy truck engine, is one of several truck engine parts now cast of Tenzaloy for high strength without weight.

High yield strength at low cost:

TENZALOY

THE SELF-AGING ALUMINUM ALLOY

If your aluminum castings are too large or too intricate for heat treatment, if your heat treating facilities are limited, if you need high strength without costly heat-treating, specify "Tenzaloy"—developed by Federated to meet the need for a superior aluminum alloy that ages at room temperature. Tenzaloy eliminates rejects due to warpage, expansion, and internal stresses caused by quenching. Tenzaloy finished properties are stable, proved by conclusive test data over a ten year period. No special foundry techniques are required. No fluxes. Castability is excellent with sand, plaster molds and many permanent molds. Tenzaloy will not "grow," produces corrosion-resistant castings with excellent polishing characteristics and anodizes clear white. Write for TENZALOY Bulletin No. 103 to: Federated Metals Division, American Smelting and Refining Company, 120 Broadway, New York 5, N. Y. or call your nearest Federated sales office.

ASARCO

AMERICAN SMELTING AND REFINING COMPANY

FEDERATED METALS DIVISION

Where to call for information:

ALTON, ILLINOIS
Alton: Howard 5-2511
St. Louis: Jackson 4-4040

BALTIMORE, MARYLAND
Orleans 5-2400

BIRMINGHAM, ALA.
Fairfax 2-1802

BOSTON 16, MASS.
Liberty 2-0797

CHICAGO, ILL. (WHITING)
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Whiting: Whiting 826

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Cherry 1-1678

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NEWARK, NEW JERSEY
Newark: Mitchell 3-0500
New York: Digby 4-9460

PHILADELPHIA 3, PENNA.
Locust 7-5129

PITTSBURGH 24, PENNA.
Museum 2-2410

PORTLAND 9, OREGON
Capitol 7-1404

ROCHESTER 4, NEW YORK
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Empire 4-3601

SAN FRANCISCO 24, CALIF.
Atwater 2-3340

SEATTLE 4, WASHINGTON
Main 3-7160

WHITING, IND. (CHICAGO),
Whiting: Whiting 826
Chicago: Essex 5-5000

IN CANADA: Federated Metals Canada, Ltd. Toronto, Ont., 1110 Birchmount Rd., Scarborough, Phone: Plymouth 73246

Montreal, P.Q., 1400 Norman St., Lachine, Phone: Melrose 7-3591

Circle 642 on Page 53

Euclid Electric & Mfg. Co., Madison, Ohio.

For More Details Circle No. 472—Page 53

Dispersions

Bulletin gives information on dag dispersion products.—Acheson Colloids Co., Port Huron, Mich.

For More Details Circle No. 473—Page 53

Radiation Warning Unit

Gamma ray and x-ray warning unit is described in this catalog. Typical installation is shown.—Princeton Div., Curtiss-Wright Corp., P. O. Box 110, Princeton, N. J.

For More Details Circle No. 474—Page 53

Hoist Products

Catalog R offers descriptions and illustrations of hoist products for overhead handling.—Harrington Co., Plymouth Meeting, Pa.

For More Details Circle No. 475—Page 53

Self-Dumping Steel Hoppers

Descriptions of cost-saving advantages of self-dumping steel hoppers are contained in Bulletin 265. Photographs and specifications are included.—Roura Iron Works Inc., 1402A Woodland Ave., Detroit, Mich.

For More Details Circle No. 476—Page 53

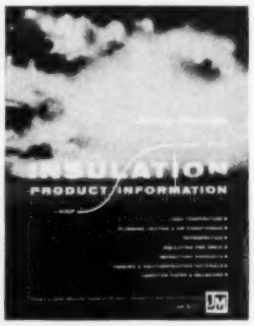
Overhead Cranes

Type LSA overhead cranes are described and illustrated in Bulletin L-116—Northern Engineering Works, 210 Chene St., Detroit 7, Mich.

For More Details Circle No. 477—Page 53

Thermal Insulation

Fifty-four page Catalog IN-244A completely describes thermal insulation for



all types of requirements in applications from −400 to 3000° F.—Johns-Manville Sales Corp., 22 E. 40th St., New York 16, N. Y.

For More Details Circle No. 478—Page 53

Trucks and Trailers

Advantages of trucks for plant and warehouse material handling are outlined in an illustrated folder.—Palmer-Shile Co., 16033 Fullerton Ave., Detroit 27, Mich.

For More Details Circle No. 479—Page 53

Barrel Finishing System

"The Abrasives' Workshop" gives information and suggestions on the Carbotrol 7 system of barrel finishing.—Carborundum Co., Advertising Branch, Buffalo Avenue, Niagara Falls, N. Y.

For More Details Circle No. 480—Page 53

Stationary Air Compressors

Four-page folder describes and illustrates stationary air compressors. Specifications are included.—Atlas Copco, 545 Fifth Ave., New York 17, N. Y.

For More Details Circle No. 481—Page 53

Synthetic Resin

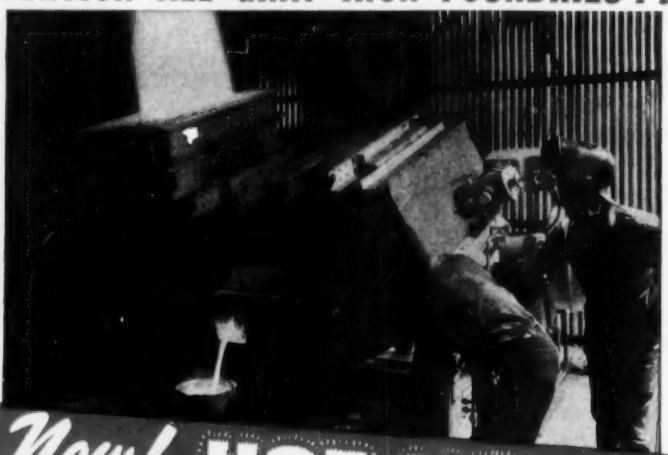
Technical Bulletin F-3-Rb describes Foundrez 7520 synthetic resin.—Foundry Products Div., Reichhold Chemicals Inc., RCI Bldg., White Plains, N. Y.

For More Details Circle No. 482—Page 53

Welding Electrodes

Descriptions of products and engineering data are given in 64-page Catalog ADC 650. Catalog contains charts of

ATTENTION ALL GRAY IRON FOUNDRIES . . .



Now! HOT METAL
For Pouring Light and Difficult Castings—Available in the . . .
NEW U. S. "SKLENAR"
REVERBERATORY
MELTING FURNACE

LOOK AT THE RECORD

Here's authentic performance data on 500 lb., 1000 lb., and 2000 lb. U. S. "Sklenar" Furnaces equipped with straight gas, oil, or dual fuel burners (no addition of fuel oil necessary when firing with gas), all three furnaces melting gray iron to high temperature for pouring light and difficult castings, with full charges consisting of one half pig iron, with balance in gates, risers and ordinary purchased scrap.

MELTING DATA

500 LB.	1000 LB.	2000 LB.
Time: 30 min.	Time: 40 min.	Time: 45 min.
Oil Used: 11½ gals.	Oil Used: 19 gals.	Oil Used: 40 gals.
*Gas Used: 1400 cu. ft.	*Gas Used: 2800 cu. ft.	*Gas Used: 5250 cu. ft.

*1030 BTU

Really hot metal . . .

of sufficient temperatures to pour light and difficult castings of excellent structure and machinability, with practically no rejects—that's the money-saving story behind the performance record of the revolutionary new U. S. "Sklenar" Reverberatory Melting Furnace. Innovations in combustion, design and construction, with patented features that contribute to faster melting, built-in economy of operation, and lower maintenance costs, are all yours in tomorrow's method of melting metals today!

Available in sizes ranging from 500 to 2000 lbs.—iron, brass and bronze (⅓rd these capacities for aluminum melting).

Get free bulletin. Send today for valuable and informative brochure.

For over 40 years builders of the well-known and favorably regarded U. S. Rotary Melting Furnaces.

U. S. SMELTING FURNACE CO.
BELLEVILLE, ILLINOIS

Sand is only part of the picture

MANIFOLD CORE PRODUCED BY HARSCH-EBALOY CORPORATION, ROCKFORD, ILLINOIS

IMPROVE PRODUCTION...CUT COSTS...SMITH L-O CORE OIL

Whether your cores are for jobbing or production casting . . . are large or small . . . bulky or delicate — you will arrive at a high percentage of profit using foundry-proved Smith L-O Core Oil. And, with 20 grades available, your production runs smoothly and efficiently because you select the right oil for the sand you use and type of metal cast.

So, look first to Smith L-O . . . *the name that stands for a service as well as a product.*

SMITH REPRESENTATIVES

- ALGONQUIN CHEMICAL CO., INC. Hamburg, Pennsylvania
- FOUNDRIES MATERIALS CO. Coldwater, Michigan
- FOUNDRY SERVICE CO. Birmingham, Alabama
- F. F. SHORTSLEEVE Elmira, New York
- ATLAS FOUNDRY SUPPLY CO. Santa Ana, California
- ST. LOUIS COKE & FOUNDRY SUPPLY CO. St. Louis, Missouri
- BRUCE-CONREAUX CO. INC. Indianapolis 19, Indiana
- WESTERN INDUSTRIAL SUPPLY CO. Portland 14, Oregon
- MALCOLM G. STEVENS Arlington, Massachusetts
- OVERSEAS COMMODITIES, LTD. Vancouver, B.C., Canada

SMITH OIL & REFINING CO.

INDUSTRIAL DIVISION

ROCKFORD, ILLINOIS

Circle 644 on Page 53

In Milwaukee, The Vilter Manufacturing Company uses . . .

3/4 inch of
BERLITE
to line
2600 lb.
ladles

BERLITE-lined
2600 pound ladle

IRONTON
BERLITE
is "insurance" for the Vilter foundry where VILTRITE castings have to be right the FIRST TIME. The superintendent there specifies BERLITE for lining ladles because his long experience shows consistently...absolutely

- NO EROSION
- FORMS NO SLAG
- NO METAL STICKS

TO BERLITE LINING

(any skull that forms in ladle is easily knocked out without harm to the lining)

All the facts on this BERLITE application are available from Ironton. If you want to test Ironton BERLITE in a ladle, let us know. We will show you what a RELIABLE REFRACTORY can do!

THE IRONTON FIRE BRICK COMPANY
SINCE 1917
IRONTON, OHIO

1327 Ashtabula Street
Write or call Ironton collect for name of nearest representative.

Circle 645 on Page 53

recommended electrodes for welding steels and comparison tables for mild steel and hardfacing electrodes.—**Air Reduction Sales Co., division of Air Reduction Co. Inc.,** 150 E. 42nd St., New York 17, N. Y.

For More Details Circle No. 483—Page 53

Fork Trucks

Catalog page details features of electric powered fork trucks. Information on applications of the trucks is included.—**Elwell-Parker Electric Co.,** 4205 St. Clair Ave., Cleveland 3, Ohio.

For More Details Circle No. 484—Page 53

Hose Fittings

Eight-page catalog offers descriptions, illustrations, and specifications for hose

fittings and hose.—**Lenz Co.,** 3301 Klepinger Rd., Dayton 1, Ohio.

For More Details Circle No. 485—Page 53

Spur Gear Hoist

Specifications and features of aluminum spur gear hoist, model CA-10, and M-25 midget chain hoist are covered in two-page Bulletin ADH-80. — **Coffing Hoist Div., Duff-Norton Co.,** Danville, Ill.

For More Details Circle No. 486—Page 53

Hose, Fittings, and Couplings

Industrial Catalog 204 contains descriptive information about hose, fittings, self-sealing couplings, and related products. The 38-page booklet is available with plastic binding or a Kalamazoo-punched back.—**Aeroquip Corp.,** 300 S. East Ave., Jackson, Mich.

For More Details Circle No. 487—Page 53

Nondestructive Testing

Illustrated catalog explains the nature of the company's nondestructive testing equipment and the applications for which various types are intended.—**Magnaflux Corp.,** 7300 W. Lawrence Ave., Chicago 31, Ill.

For More Details Circle No. 488—Page 53

Motor Controls

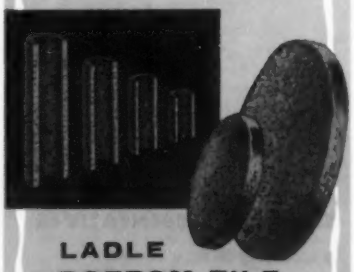
Catalog 5900 contains 72 pages describing motor controls, including manual starters, magnetic controls, drum con-

POUR
SLAG-FREE
CASTINGS

MAKE A
TEAPOT SPOUT
LADLE FROM ANY
BULL LADLE WITH

IRONTON
L.P. TILE

Get bottom-pouring advantages at low cost with Ladle Pouring Tile. Just press in or embed in green lining of the ladle, dry as usual. Sizes 6" to 28" long for 50 to 4000 pound ladles in stock. Write for details.



LADLE
BOTTOM TILE

start you with a dry bottom, with no joints. Easiest to install. Sizes 50 to 10,000 pound in stock. Larger sizes to your specifications.

THE IRONTON FIRE BRICK COMPANY
SINCE 1917
IRONTON, OHIO

1327 Ashtabula Street
Write or call Ironton 109 for the name of nearest representative.

Circle 646 on Page 53

trollers, pressure switches, pilot devices, and accessories. Illustrations and specifications are given.—**Furnas Electric Co.**, 1151 McKee St., Batavia, Ill.

For More Details Circle No. 489—Page 53

Electric Elevator Furnaces

Bulletin GED-3991 contains illustrations and descriptions of electric elevator furnaces for batch annealing of standard and pearlitic malleable iron.—**General Electric Co.**, 1 River Rd., Schenectady 5, N. Y.

For More Details Circle No. 490—Page 53

Lift Truck

Design and engineering advances of Stream-Liner series of lift trucks are pre-

sented in Booklet SP-10. — **Towmotor Corp.**, 1226 E. 152nd St., Cleveland 10, Ohio.

For More Details Circle No. 491—Page 53

Safety Marking

Catalog 520 features 15 different products for safety marking and identification of pipes, plant wiring, electrical equipment, and hazardous areas and equipment.—**W. H. Brady Co.**, Dept. MS, 727 W. Glendale Ave., Milwaukee 9, Wis.

For More Details Circle No. 492—Page 53

Process Equipment

Equipment for the process industries is described in a 12-page bulletin. The bulletin, G-3C, discusses applications and performance characteristics of the equipment.—**Fuller Co.**, subsidiary of General American Transportation Corp., Catasauqua 2, Pa.

For More Details Circle No. 493—Page 53

Roof Exhausters

AlumaLung aluminum roof exhausters are described in Bulletin 52. Features, illustrations, and dimensions are covered. —**Iron Lung Ventilator Co.**, 5403 Prospect Ave., Cleveland 3, Ohio.

For More Details Circle No. 494—Page 53

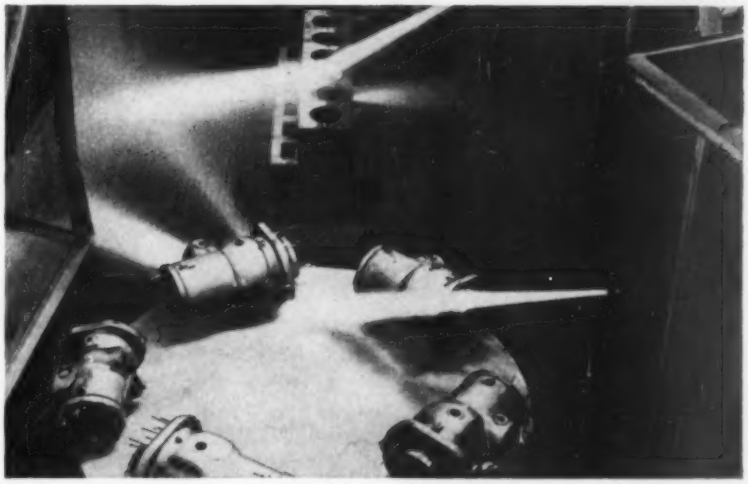
Cleaning Stars and Balls

Bulletin gives information about Abmet grinding balls and cleaning stars, including their application. Illustrations are included.—**Quincy Foundry Inc.**, Quincy, Ohio.

For More Details Circle No. 495—Page 53

HYDRO-BLAST

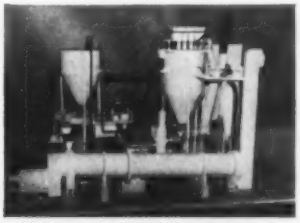
works wonders with sand!



Knocks out cores, cleans castings in a fraction of usual man hours

With Hydro-Blast Equipment, one man can clean the largest, most complicated castings in a fraction of the usual time. Heavy, intricate cores are knocked out—all casting surfaces are de-scaled, left exceptionally clean. The process is completely dustless. Hydro-Blast installations pay for themselves quickly through better, faster cleaning, more healthful working conditions.

Recent Hydro-Blast installations: General Electric Co., Schenectady, N.Y. . . . Gould Pump Co., Seneca Falls, N.Y. . . . Bethlehem Steel Co., Sparrows Point, Md.



Hydro-Blast Wet Sand Reclamation Units

Cleaner, good-as-new core and molding sand, with fully controlled classification. *Recent installations: General Electric Co., Schenectady, N.Y.... American Radiator & Standard Sanitary Co., Buffalo, N.Y.*

Hydro-Blast Dry Sand Reclamation Units

Recent installations: Farrell Birmingham Co., Ansonia, Conn. . . . Adirondak Steel Foundries, Watervliet, N.Y. . . . Amsco, Chicago Hts., Ill. . . . Midcontinent Steel Castings Co., Shreveport, La.

A-M

HYDRO-BLAST DIVISION
GUARDITE
WHEELING, ILLINOIS
DIVISION of AMERICAN-MARIETTA COMPANY

let's look at the figures

When it comes to choosing the right core oil for making your casting, there are 10 figures to check before making your decision. They are the 10 reasons why there is a grade of Penolyn Core Oil to meet the most exacting requirements of every Foundry and Core Room practice. Look at the figures and you'll—

If you require expert technical assistance or technical data regarding your present or future casting operations, just call the Penola office nearest you. Or write: Penola Oil Company, 15 W. 51st St., New York 19, N. Y.

Penola

specify PENOLYN CORE OIL

for these 10 important casting advantages:

1. Dependable uniformity
2. Concentrated form
3. No obnoxious odor
4. Seepage eliminated
5. No crusting, green mix
6. Always clean working
7. Wide temperature range
8. Polymerized formulation
9. Minimum gas
10. Ample collapsibility

PENOLA OIL COMPANY • NEW YORK • CHICAGO • DETROIT

Circle 648 on Page 53

MALLEABLE FOUNDERS
. . . Find It Pays To Advertise

● "I AM seeking a material and a means of manufacturing a chain component. This item is more easily cast than forged. If uniformity and dependable strength can be obtained by using malleable castings, perhaps these units could be cast rather than forged."

"I request *Data Unit* 102—*Strength* and any other pertinent information that would permit me to determine the applicability of malleable castings for machine parts."

"We are interested in determining the strength ratio of malleable iron to forged steel for line hardware."

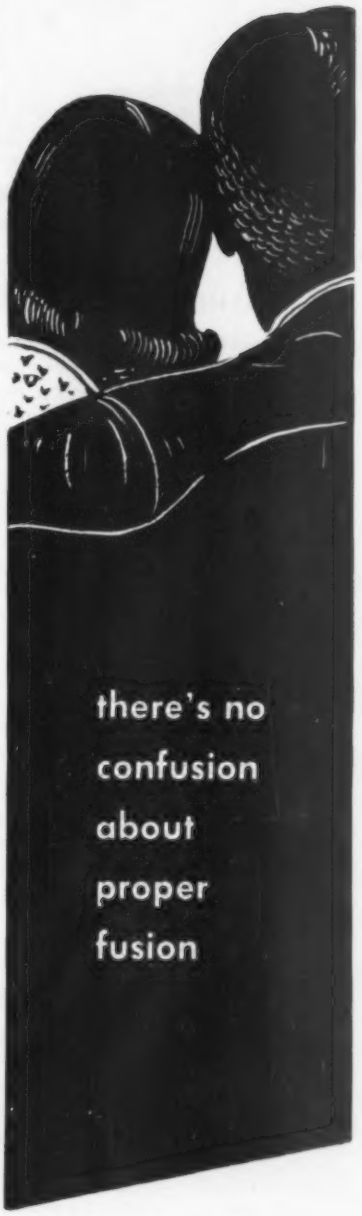
These are quotes from a few of the letters received in response to the 1959 advertising program of the Malleable Castings Council. The colorful advertisements developed over 1400 such inquiries in the first year.

The six advertisements in the 1959 series appeared in more than 100 issues of 11 business publications read by designers, engineers, purchasing agents, production men, and general executives in all segments of the metalworking industries.

The Malleable Castings Council is a unique group. It is a voluntary association of malleable foundries, organized in 1958, to do a specific job—promote malleable castings.

Organization of the council came about through the desire of the Market Development Committee of the Malleable Founders' Society to do a better job of promoting malleable on a national scale. Committee members felt that the first step in such a program was intensive and dramatic advertising designed with two objectives: 1. To educate customers and potential customers on the attributes of the material. 2. To create a better image for malleable castings as a modern, economical material of great strength and economy.

Because of the nature and size of the program, it was decided that it should be handled and financed by a separate organization. Thus, the Malleable Castings Council was



Colorful advertisements of the Malleable Castings Council consist of two pages—left, a four-color illustration; right, copy detailing the subject

Machinability in Malleable
Machining Malleable Castings—Important Key to Cost Reduction
Comparison Shows Malleable's Superiority
Typical Example Shows Savings of 70% to 350%

SEE NEXT PAGE . . .

fine FANNER

...the Best chaplets ever developed

THREE EXCLUSIVE FEATURES and these standard features

1 FEATHEREDGE FUSION RINGS

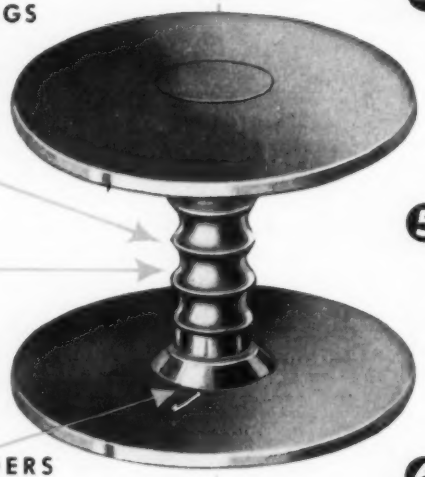
Knife-like edges on the multiple rings heat instantaneously to fusion temperature — completely sealing chaplet into casting and eliminating leakers.

2 COMPLETE CONTACT RADIUS GROOVES

Molten metal rolls up solidly against the rounded bases of the radius grooves. Greater chaplet area contact results in maximum fusion. No sharp angles to trap gasses or weaken stem strength.

3 COUNTERSUNK SHOULDERS

Heavy, tapered shoulders provide solid support to plates — allow full contact with molten metal. No sharp angles to create voids usually formed under heads of ordinary chaplets.



4 FULL STRENGTH

Reinforced construction at all required points provides maximum support without use of extra heavy metal.

5 PURE TIN COATING

The surest protection against rust, as well as aid to fusion. Readily alloys with iron and steel, lowering melting point and improving fusion. Also available in pure copper.

6 PRECISION TOLERANCES

Held to ± .002 on most sizes, Fanner reputation for accuracy is unequalled.

HERE IS WHY THESE FEATURES MEAN BETTER CASTINGS FOR YOU

✔Assured Core Support ✔Maximum Fusion
✔Freedom from Leakers ✔Accurate Wall Thickness

The Groovestem Chaplet is the direct result of Fanner pioneering and development to provide foundries everywhere with chaplets that would assure better quality castings. Since their introduction, millions of Fanner Groovestem Chaplets have been used by all types of foundries and it has been proved that these chaplets are responsible for savings in time and labor and for reducing casting scrap. For the best results always specify Fanner Groovestem Chaplets, they are available in a wide variety of styles and sizes.

Write for catalog or samples and prices.

THE FANNER MANUFACTURING CO.

Designers and manufacturers of fine FANNER CHAPLETS AND CHILLS

GROOVESTEM CHAPLETS

to insure maximum fusion and support

FANNER DESIGN TAKES ADVANTAGE OF ALL METAL CHARACTERISTICS

COUNTERSUNK SHOULDERS ELIMINATE GAS POCKETS

Sharp, right angle shoulders of conventional types of chaplets form large gas pockets.

Raised shoulder of this type reinforces but tends to form small gas pockets.

Fanner Countersunk shoulder has a taper design which reinforces head and eliminates gas pockets.

FEATHEREDGE FUSION RINGS ELIMINATE LEAKERS

Rolling metal does not seal against straight side of conventional stem; small pockets remain.

Deformed stem offers better sealing surface for metal, but some voids may be created on inside radii.

Knife-like edges of fusion rings of Fanner Chaplet heat instantly, fuse completely, eliminate leakers.

RADIUS GROOVES EFFECT MAXIMUM FUSION

Conventional chaplet fails to fuse completely both along stem and at shoulders.

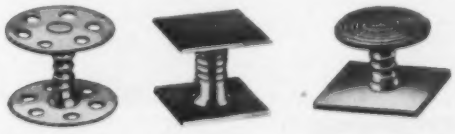
Threaded stem creates gas pockets at base of threads.

Rounded grooves of Fanner Chaplet permit metal to "lay up" close to stem and effect maximum contact and fusion.

SPECIFY FANNER GROOVESTEM CHAPLETS

Studies conducted by Battelle Memorial Institute of Columbus, Ohio, supplemented by field tests in leading foundries, prove that the new Fanner Groovestem Chaplet provides the maximum in core support and completeness of fusion. Companies doing critical casting work have confirmed its superiority and have standardized on this new chaplet. To insure that you get maximum casting efficiency on every job, always ask for Fanner Groovestem Chaplets. They are stocked in substantial quantities to give you the fastest possible service.

FANNER GROOVESTEM CHAPLETS ARE AVAILABLE IN THESE TYPES



MOTOR DOUBLE HEAD BUTTON HEAD

BROOKSIDE PARK · CLEVELAND 9, OHIO

Circle 649 on Page 53

created and officially went into business in September, 1958. By Nov. 1, almost $200,000 had been pledged and on Jan. 1, the first advertisement in the series appeared.

Advertising Themes—Each of the six 1959 advertisements had a theme—strength, uniformity, versatility, machinability, usability, or toughness. Each offered a Data Unit on the same subject, if the reader wanted more detail. More than 1400 direct requests for these Data Units were handled in the first year, and members of the council distributed another 46,000.

The advertisements consist of two facing pages—a "spread." The lefthand page is a full four-color illustration, with the righthand page largely copy and illustrations detailing the subject. All member companies have their names listed on the righthand page.

The full-color pages were printed and shipped to the magazine for insertion. Another 2 million of these inserts also were printed and distributed in the first year. For the righthand page, printing plates were made and sent to the magazines.

Prior to publication, copy is checked for accuracy by a 13-man Technical Advisory Group and the 10-member Steering Committee, which is made up of industry executives and marketing experts. Comments and suggestions received are resolved, and the advertisement is put in final form by a Copy Committee.

Results of the Program—It is difficult to assess the exact impact of such a program. All available measures of effectiveness point, however, to extremely good results. All readership rating reports have placed these advertisements among the top few in the particular issue.

A study was run on the Data Units, to see how they were accepted by people who received them. The response was very favorable, and well over half asked for others in the series. Another study was made of people who read the advertisements and asked for Data Units to find out what sort of applications for malleable iron they had in mind when they requested further information. The list of applications compiled from the more than 100 who responded included a great number of parts and components similar to present uses of malleable iron, plus some very interesting new ideas. All inquiries received are passed on to members of the council on a regular basis.

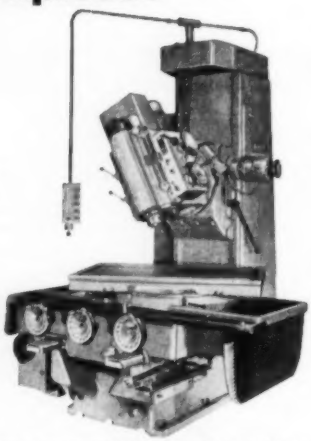
An interesting by-product of the advertising is a buildup of data on what subjects seem to attract the most attention. Customers apparently want information on the general properties of the material so that they can fit it into its proper place, as far as their products are concerned, in the spectrum of available materials. Once this information is absorbed, comparative finished part cost between materials becomes a prime consideration.

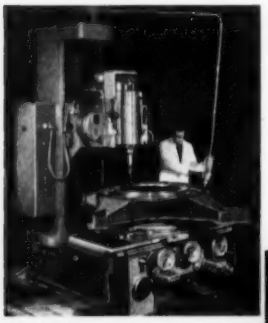
1960 Program—The 1960 program of the Malleable Castings Council will feature five ads of a type similar to those used in 1959, plus a striking two-color spread highlighting the use of malleable on the new small cars. Slight changes have been made in the approach with less emphasis on the detailed characteristics of the material and

Avoid Double Handling of Large, Heavy Workpieces

with a BOKOE F3 Universal Miller

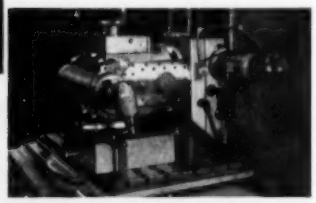
Save costly set-up time and avoid transferring bulky workpieces from one machine to another—with the BOKOE F3 Universal Milling and Boring Machine. On one, versatile machine you can now perform boring, milling and drilling—often on 5 sides—without re-setting the workpiece. The remarkably flexible operation of the BOKOE F3 is especially suited for the machining of ferrous and non-ferrous castings, dies, molds, and metal and wooden patterns. Check these many BOKOE features for *your* production needs . . .





Rotary milling on large component.

- Coordinate positioning of rotary worktable with steplessly adjustable feeds for transverse, longitudinal and rotary movements—operating either individually or simultaneously. Rapid travel for all three directions.
- Clamping area up to 63" x 31.5". Longitudinal movement up to 72", transverse movement up to 28". Maximum workpiece diameter for circular and radius milling, up to 98". Maximum distance, main spindle to column, 48".
- Stepless spindle speeds from 36—1800 rpm. Six spindle feeds from .0016 to .016 in./revolution. Spindle slide rotates 90° in either direction. Entire column rotates 360°.
- All electrical equipment in accordance with J.I.C. standards.



Head turned 90° with right-angle milling attachment.

Write For Information

COSA

Importers of Leading Precision Machine Tools
Nationwide Sales and Service
COSA CORPORATION, 405 LEXINGTON AVENUE, NEW YORK 17, N.Y.

IN CANADA contact COSA CORP. OF CANADA, LTD., 1160 Lakeshore Rd., Long Branch, Toronto 14, Ont.

more on specific case histories of cost savings.

The Malleable Castings Council is headed by President Robert J. LaMarche, American Malleable Castings Co., Marion, Ohio. Vice president is James Sweeney, National Malleable & Steel Castings Co., Cleveland; Thomas T. Kirby, Northern Malleable Iron Co., St. Paul, is secretary; and Joseph E. Hornstein, Meadville Malleable Iron Co., Meadville, Pa., is treasurer.

Council headquarters are at 781 Union Commerce Bldg., Cleveland. Lowell D. Ryan is assistant secretary-treasurer, and Donald B. Sanberg is advertising director.

Copper Products Development Association Is Formed

Six major copper producers are charter members of the newly formed Copper Products Development Association Inc. These producers include American Metal Climax Inc., American Smelting & Refining Co., Anaconda Co., International Nickel Co. of Canada Ltd., Kennecott Copper Corp., and Phelps Dodge Corp.

Dr. Clyde Williams, former president, Battelle Memorial Institute, Columbus, Ohio, has been named technical director pro tem. Initially, the board of directors consists of two members of each of the charter companies.

The new organization will allocate research assignments to individuals, universities, and established research organizations. In addition, the nonprofit association will have a technical development committee and a market development committee.

1959 Edition of Statistical Abstract Now Available

The *Statistical Abstract of the United States* reflects a wide variety of facts covering the space age. The volume contains half a million facts about the social, economic, and political life of the United States. A new grouping of tables devoted to national scientific development is included.

Buckram-bound copies of the 1959 edition can be purchased for $3.50 each from field offices of the U. S. Department of Commerce.

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by hundreds of American Foundries and other abrasive users.

EXPENDABLE PALLET PACK

Forty 50 lb. cartons in one master pack: easy to store, easy to inventory, easy and safe to handle. No extra Cost. Also in conventional 100 lb. or 50 lb. bags.

There is no better shot and grit than that distributed by Hickman, Williams & Company: CONTROLLED "T"; PERMA-Shot; PERMA-Grit; PERMA-Steel and PERMABRASIVE. All five have been, for many years, the first choice of the largest users of abrasives. We can meet your specifications and, at the same time, reduce your costs.

It costs you nothing to get the Real Facts about ABRASIVES.

70 Years of Service to American Foundrymen

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Established 1890

Around the Country

NEWS REPORTS FROM

Boston . . . Philadelphia . . . Pittsburgh . . . Chicago

Philadelphia— Ferrous casting demand is livelier, with prospects for March the best since last fall. Not only is business in the light and medium lines expanding, but there is some improvement in heavy castings, despite a continued lag in die work. Heavy industrial machinery specifications are more active.

OLD STYLE GRINDERS
WASTE UP TO 45% OF YOUR GRINDING WHEELS!
AS WHEEL WEARS, SPEED DECREASES, PRODUCTION SLOWS!
STANDARD
INFINITELY VARIABLE SPEED
SNAGGING GRINDERS
adjust automatically with wheel wear to maintain proper peripheral speed.
You get FULL WHEEL WEAR DOWN TO THE FLANGES!

By merely turning a handle — *no tools required* — constant adjustment of wheel speed to compensate for wear is another EXCLUSIVE from STANDARD. STANDARD SNAGGING GRINDER installations coast to coast report wheel savings as high as 100% and increased production of up to 50%. Write today for our "Case History" file of *Savings Up-Cost Down Stories* that are proof positive!

33VR LEFT HAND

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FOUNDRY SHOW
Philadelphia
May 9-13
Booth 230

FOUNDRY GRINDER DIVISION
the STANDARD electrical tool co.
SINCE 1912
SNAGGING GRINDERS AND MACHINE TOOLS
2507 RIVER ROAD • CINCINNATI 4, • OHIO

General improvement applies not only to gray iron, but to steel and malleable castings, although demand for malleable has been brisk all along, barring the year-end lull. Malleable shops are operating five to six days, with demand for pipe fittings and hardware particularly strong.

Gray iron work is being bolstered by casting specifications for paper machinery, power transmission equipment, tobacco machinery, and material handling equipment. Good specifications are coming out also from the tobacco machinery people and to some extent from construction supply manufacturers.

Most gray iron shops are operating five days a week, with backlogs now averaging around four to five weeks, compared with three to four weeks earlier in the year. Most shops are taking on new men slowly, however, preferring for the present to pay overtime where necessary.

While steel foundries are doing a little better, and in most cases are operating five days a week, some are operating only seven hours a day and are still having difficulty building up backlogs beyond four to five weeks.

Brass shops are losing no ground, but there is question if they are gaining much. Ship work has been affected adversely by strikes at some of Bethlehem's eastern yards. Valve and water meter requirements are moving well. Most aluminum job shops are active.

Pittsburgh— Heavily dependent on sales to the steel industry, local foundrymen think it's only a matter of time before they'll be getting some sizable orders. A buyer at one of the district's largest mills recently confided that he was "scratching bottom" on maintenance and repair castings and would soon run out of spares. Asked why he wasn't in the market, he explained: "We have to stay within our budget. I'm not authorized to buy anything for the second

Circle 652 on Page 53

FOR YOUR FOUNDRY...

THERE'S A

DELTA

COST-CUTTING

CORE & MOLD WASH...

DESIGNED EXPRESSLY TO:-

1. SPEED PRODUCTION OF FINER-FINISH CASTINGS

2. CUT CLEANING ROOM COSTS

3. REDUCE SCRAP & REJECT CASTINGS TO A MINIMUM

4. LOWER PRODUCTION COSTS

5. GIVE CORES & MOLDS BETTER DIMENSIONAL STABILITY

Working samples, together with literature on Delta Core and Mold Washes, will be sent to you on request. Tell us the kind of castings you make — steel, gray iron, malleable, non-ferrous — and such other information as you care to add. If you have a particular problem, tell us about it. Delta foundry technicians are qualified to recommend Delta Foundry Products for specific applications in all types of foundries.

All Delta Core and Mold Washes are quality controlled... your assurance of uniform results at all times.

OUR 27TH YEAR

DELTA

GOOD TO THE CORE

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MANUFACTURERS OF
SCIENTIFICALLY CONTROLLED FOUNDRY PRODUCTS

from START
to FINISHing

...in foundries
it's
KIRK & BLUM

COOLING—Large volume of air passing through cooling tunnel removes fumes, cools molds.

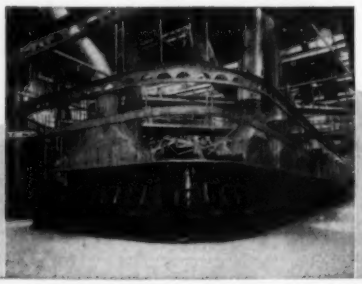
You'll find KIRK & BLUM Systems in leading foundries. To control dust and fumes from all foundry operations, count on KIRK & BLUM for the complete job—design, fabrication and installation.

From 50 years of experience, Kirk & Blum Engineers have gained skill that can be used effectively in your foundry, large or small. For a no-obligation survey or further information, write: The Kirk & Blum Mfg. Co. 3108 Forrer Ave., Cincinnati 9, Ohio.

GRINDING-SNAGGING — Battery of double grinders exhausted by Kirk & Blum system; dry collection.

KIRK & BLUM

DUST AND FUME CONTROL SYSTEMS



POURING — Hood collect fumes over entire length of moving floor, "Pouring" station.

quarter until the end of February."

Railroad suppliers report that new orders are coming in at a good rate. The upturn started in December. Sensing that government pressures would force an end to the steel labor dispute, railroads released big orders for car sets and couplers on the assumption that they would be able to get all the plates and structurals they would need for their car building programs. A leading producer of railroad castings is working close to capacity on a single shift, five-day basis. Backlog—about three and one-half months, which a sales official calls "average for good times."

Prices of railroad specialties haven't been hiked since July 1, 1957, but producers say they'll have to seek increases this year if they're forced to accept the big steel wage package. The best guess is that they'll raise their quotations about 5 per cent.

Although captive foundries are somewhat busier than the job shops, sales in both areas leave much to be desired. The trend is upward, but incoming orders remain sporadic. Orders from hydraulic press manufacturers are few and far between. As one man put it, "The heavier presses just aren't being bought." Sales to manufacturers of forging, boltmaking, and nailmaking machines are rising, reflecting good business for makers of medium and lighter equipment.

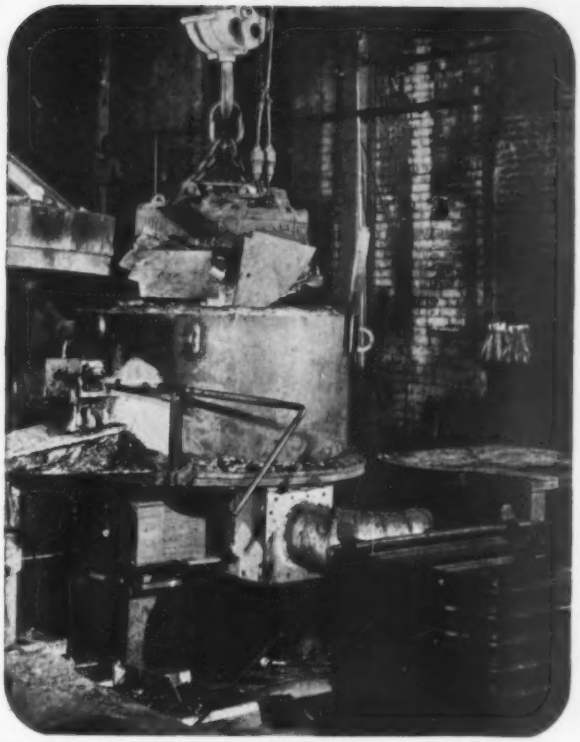
Within the city, foundries that make ingot molds or plumbing fixtures seem to be busiest. On the outskirts, the most active shops are suppliers to the automotive or agricultural equipment industries. It's the consensus that the outlook for almost all foundries will be considerably brighter in the second quarter.

Boston—Gray iron jobbing foundries have slowly increased their melt to approximately 75 per cent of capacity, up several points from February operations. Most shops are operating a 40-hour week but could produce more castings if backlogs were heavier; orders are slightly more numerous but are for prompt shipment. Machine tool volume is slow, only mildly heavier than last quarter.

Shops producing castings for out-

Circle 654 on Page 53

5 ways to make your foundry more efficient with OHIO MAGNETS

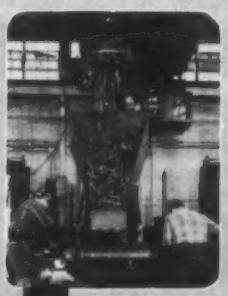


1 CHARGING FURNACE. One 36-inch Ohio Bolted Magnet charges six 375 KW furnaces giving 240 500-pound heats each 24 hours.

2 SCRAP HANDLING. All scrap is handled efficiently, economically with Ohio Magnet. Single 36-inch magnet replaces grapple, clamshell, bucket or lift truck.

3 SORTING. Castings are conveyed from Wheelabrator to hard-iron inspection. Ohio Magnet picks parts out of sorting bins.

4 UNLOADING ANNEALING FURNACE now takes one man 10 to 20 minutes with Ohio Magnet. Lift truck used to take 1 to 2 hours.



5 LOADING GRINDING HOPPER after conveying parts from inspection department. Same Ohio Magnet is used for operations shown in photos 3, 4 and 5.

Photos: Courtesy I-F Manufacturing Company, New Philadelphia, Ohio

ohio ELECTRIC

Small foundry or large, magnetic materials handling points the way to higher productivity, higher efficiency. And with Ohio Magnets on the job you get high availability, too. That's because Ohio Magnets are built with that extra margin of safety that means long, service-free life. Yes, *magnetic materials handling pays—especially with Ohio Magnets.*

THE OHIO ELECTRIC MFG. CO.

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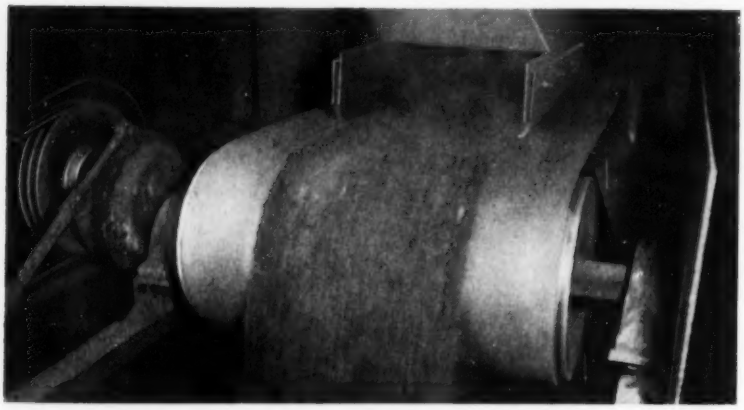
Subsidiary of Howell Electric Motors Company

AA-5888

Circle 655 on Page 53

"STEARNS MAGNET PULLEY SAVES US $3,000 PER YEAR"

Says Foundry Superintendent



Here the Stearns Series 410 20x24 pulley, mounted in a pulley separator unit, removes tramp iron from foundry sand at Falls Foundry, Menomonee Falls, Wisconsin.

"No more damage to patterns"
"No more injury to workers' hands"

Falls Foundry, Menomonee Falls, Wisconsin, installed a new Stearns INDOX V permanent magnet pulley about a year ago. A. E. Lapp, foundry superintendent, states: "This Stearns unit is doing an outstanding job. We run about 125 tons of sand over the pulley every day, and pull out about a half to three-fourths of a ton of iron a day. Before we put this magnetic pulley in, we reclaimed the sand by means of a sand cutter and brush system. The first time we used the pulley, we pulled out about 6 tons of iron."

Saves patterns, workers' hands

Mr. Lapp estimated that before installing the pulley, the company had about $150 per month in pattern damage. This was due to chunks of iron that were left in the sand. Since putting in the Stearns pulley, they have not had a single bit of pattern damage. The same thing with injuries. Before the pulley, workers were constantly hurting hands and fingers on sharp iron bits. Now there are no cases of hand injury while working in the sand. Mr. Lapp further states: "We used to pay a salvage outfit $5 a ton of scrap metal to salvage it. Taking this saving along with our pattern saving, we're ahead about $3,000 a year. You couldn't take this pulley away from me."

No Electrical Cost

Find out how a new INDOX V magnet pulley can save you money. No electric cost — no maintenance cost — tremendous magnetic pulling power. Nothing matches this new INDOX V material. A Stearns representative can give you facts and figures. Write us today for nearest representative and new free literature. Specify Bulletin 1021G.

STEARNS MAGNETIC PRODUCTS

DIVISION OF INDIANA GENERAL CORPORATION • VALPARAISO, INDIANA

635 South 28th Street • Milwaukee 46, Wisconsin

Profit with Stearns — First with Ceramic Magnet Separators for Industry

107

side construction work, notably highways, have been favored by mild weather and seasonal demand is improved. Malleable foundries for some months have operated at a somewhat higher rate than gray iron producers; most continue to do so but are dipping into backlogs. New malleable orders declined during first quarter, contrary to expectations. As with gray iron, most malleable production in New England is by jobbing shops.

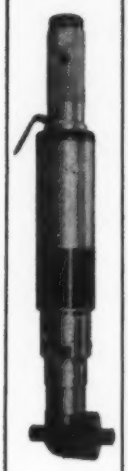
Integrated foundries in the textile mill equipment field average somewhat above jobbing iron and steel shops. They have good backlogs, but little of this work is being farmed out. In the past, textile machinery castings have been sublet in considerable volume, but most of these foundries are now mechanized and able to provide the bulk of their requirements.

Demand for steel castings is slowed by lag in heavy equipment, although there is mild improvement in heavy electrical machinery. Shipyard volume has been blunted by strikes at Bethlehem's eastern yards. Nonferrous orders have improved slightly since first of the year, but business is far from brisk. Demand for meters and fine aluminum work for electronics makes the best showing.

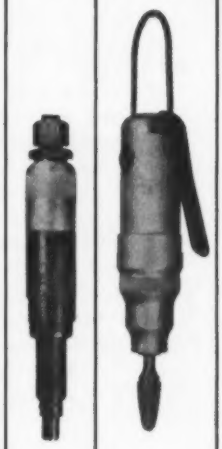
Eastern Gas & Fuel Associates, Everett, Mass., will discontinue production of metallurgical coke at Everett, Mass., April 30, changing to natural from mixed gas for Boston district utilities; 108 by-product ovens are effected. Production of coke will be continued by Eastern at New Haven, Conn., and Philadelphia. This company's subsidiary, Mystic Iron Works, went out of pig iron production last year. Remaining stocks are being depleted and users of pig iron are seeking new sources.

Some foundries are confronted with increased pig iron prices, up to $5 a ton, and foreign iron will be a factor. Imported iron is being offered under Mystic's disposal price and some tonnage is being bought.

Chicago— Cook County board of commissioners is nearing action on the proposed comprehensive amendment to the Cook County zoning ordinance, following a series of public hearings. Next scheduled



Cleco air tools range in type and size from a small precision die grinder (length: 4⅞ ins. — weight: 12 ozs.) to custom-designed multiple spindle assembly units. This complete line includes Cleco's amazingly unique Clecomatic* screwdriver — nut-runners and nutsetters. The completely automatic air tools with positive torque control!



Cleco air tools are as quiet, as light weight, as economical, and as maintenance free as a tool can be and still do the job it was designed to with more efficiency than its rated capacity calls for. This is a true characteristic of Cleco Tools . . . their job performance usually exceeds your most critical demands.

To see how well a Cleco production-proved tool can do your job, call your Cleco® representative for a demonstration-tryout.

*TRADEMARK

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AIR TOOLS

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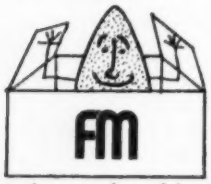
Circle 657 on Page 53

THE FM PORTABLE GRINDING TEAM IS READY TO GO...

to welding shops . . .

gray iron foundries . . .

steel foundries . . .



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any place where fast, economical grinding is important! Call us today!

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VITRIFIED and RESINOID GRINDING WHEELS and SEGMENTS

THE FM
FULLER MERRIAM CO.
WATER STREET
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Circle 658 on Page 53

meeting to consider action is March 7 and 8.

On Jan. 13 the Illinois Manufacturers' Association told the board of commissioners that its zoning committee still objects to the amendment but does not feel the public interest would be served by further delays if caused solely by these objections.

Erwin Schulze, attorney for IMA's zoning committee, said modifications made in the amendment, after prolonged discussion with the rezoning staff, the zoning board of appeals, and the commission was "a move in the direction of more reasonable performance standards" but that IMA's zoning committee is concerned that even in its present form the law would discourage location and expansion of industry in the unincorporated areas of the county.

He said IMA's zoning committee is of the opinion "engineering science has not reached the stage where performance standards in a zoning law are feasible. It is absolutely vital to the economy of Cook County that industry locate and expand in the unincorporated areas. We are concerned that under the proposed performance standards it would not be able to do so," Mr. Schulze said.

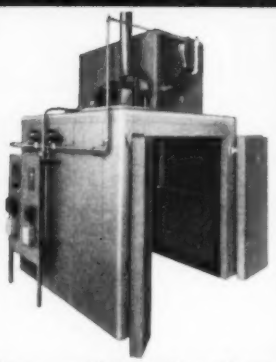
Continuing, he said "We hope we may be permitted to work closely with the zoning administrator in his administration of the law so that when weaknesses in the law develop, as we are certain they will, these defects can be brought immediately to the attention of the board of commissioners."

Although the performance standards for industry—one of the principal features of the ordinance—were lowered somewhat at the insistence of manufacturing groups who contended they were too tough, Harry Chaddick, the county's zoning consultant who drafted the ordinance, says the section on industry still has tougher provisions than those applying in the city of Chicago.

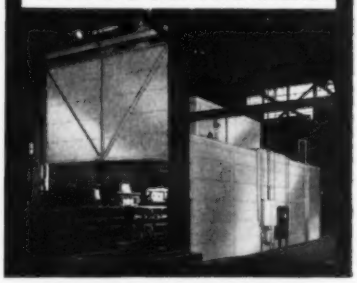
Specifically, industrial and manufacturing interests have been attempting to relax the smoke, noise, odor, and vibration restrictions of the proposed amendment. This drive for relaxation has been spearheaded by the 70-member technical committee of the IMA.

Observers point out that foundries

LANLY heat processing equipment for the FOUNDRY INDUSTRY



from small Rack type Ovens to the BIG CAR TYPE OVENS



If a need arises to replace or improve your Foundry Ovens, it is only logical to look to LANLY, recognized authorities in the design and construction of heat processing equipment for more than 22 years.

TODAY may be the opportune time to survey your present facilities and request the counsel of a LANLY representative at no obligation.

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Find Your Representative in The Yellow Pages

Atlanta, Georgia Birmingham, Ala.
Boston, Mass. Chicago, Ill. Cleveland, Ohio
Columbus, Ohio Detroit, Mich.
Rochester, N. Y. Pittsburgh, Pa.
San Francisco, Calif. St. Louis, Mo.

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would find it virtually impossible to conform to the proposed standards on smoke and particulate matter.

Steel Founders' Society To Meet in Chicago, March 7-8

Wilson H. Moriarty, first vice president and group executive of the National Malleable & Steel Castings Co., Cleveland, will take office as president of the Steel Founders' Society of America at the conclusion of the society's annual meeting at Chicago's Drake Hotel on March 7-8.

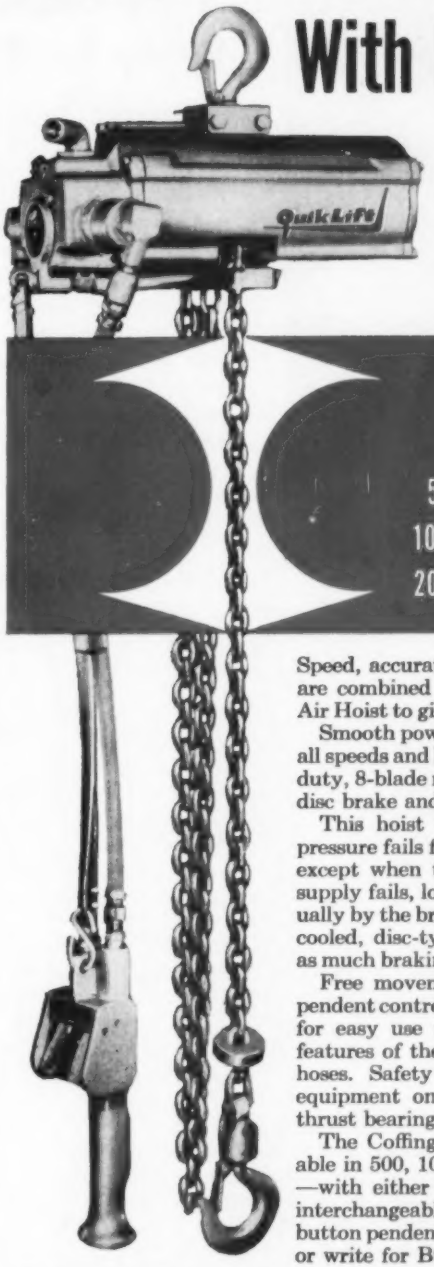
Mr. Moriarty was elected president of the society at a board of directors meeting in January. Other officers elected are: Vice president, F. B. Powers, vice president, secretary, and treasurer, Burnside Steel Foundry Co., Chicago; executive committee, R. M. Schumo, president, Pennsylvania Electric Steel Casting Co., Hamburg, Pa.; treasurer, R. G. Parks, treasurer, National Malleable & Steel Castings Co., Cleveland; executive vice president and secretary, F. Kermit Donaldson; technical and research director, Charles W. Briggs; market development director, George K. Dreher; assistant secretary, Erwin Dieckman. Officers were elected for a one-year term.

WILSON H. MORIARTY
SFSA President-elect

Mr. Moriarty will succeed Ross L. Gilmore, president, Superior Steel & Malleable Castings Co., Benton Harbor, Mich., who retires after two terms.

The board of directors announced the election of four new directors by members of Divisions 1, 3, 5, and

Faster Load Lifting With New Coffing Quik-Lift Air Hoist



12 MODELS
lift full load 10 feet
500-pound hoist— 7 seconds
1000-pound hoist— 9 seconds
2000-pound hoist—24 seconds

Speed, accurate control, safety and long life are combined in the new Coffing Quik-Lift Air Hoist to give you efficient hoisting power.

Smooth power flow and absolute control at all speeds and loads is provided by the heavy-duty, 8-blade rotary air motor, the air-cooled disc brake and sensitive controls.

This hoist will not drop its load if air pressure fails for the brake is always engaged except when the motor is activated. If air supply fails, load can be safely lowered manually by the brake adjustment screw. The air-cooled, disc-type brake provides four times as much braking area as conventional brakes.

Free movement so that the push-button pendent control is always correctly positioned for easy use is provided by the swiveling features of the air supply hose and pendent hoses. Safety hooks, which are standard equipment on all models, swivel on roller thrust bearings.

The Coffing Quik-Lift Air Hoist is available in 500, 1000 and 2000-pound capacities —with either link or roller chain and with interchangeable manual pull-cord or push-button pendent controls. Ask your distributor or write for Bulletin ADH-79.

COFFING HOISTS

DUFF-NORTON COMPANY
825 Walter Street • Danville, Illinois

COFFING HOISTS
Ratchet Lever • Air
Hand Chain • Electric

DUFF-NORTON

DUFF-NORTON JACKS
Ratchet • Screw
Hydraulic • Worm Gear

Circle 660 on Page 53

FRANK G. STEINEBACH

"Is the Foundry Industry Ready for the Soaring Sixties?"

Here is an interesting special editorial report that will discuss the ability of the foundry industries to meet the challenge of the sixties. Pick any superlative you want for the sixties . . . soaring, booming, or golden—whichever you choose it's likely to be right, because the next ten years will probably provide great opportunities for men in the metal casting industries. You can read about the industries' plans for the sixties and how they will affect you in the . . .

May 1960
Pre-Convention Issue of FOUNDRY

7. Elected for two-year terms starting after the annual meeting were Mr. Schumo, Division 1; John A. Ross, secretary-treasurer, Dibert, Bancroft & Ross Co. Ltd., New Orleans, La., Division 3; W. P. Dudley, vice president and general manager, Springfield, Ohio, plant of Ohio Steel Foundry Co., Division 5; and J. F. Eberle, vice president in charge of sales, Missouri Steel Castings Co., Joplin, Mo., Division 7.

L. C. Mertz, retired executive vice president of Unitcast Corp., Toledo, and C. L. Heater, retired vice president of American Steel Foundries, Chicago, will attend the annual meeting for the first time as honorary members. They were elected honorary members of the society at the January board meeting.

At the annual meeting, reports will be given by retiring president Gilmore; R. G. Parks, treasurer of the society; and F. Kermit Donaldson, executive vice president of SFSA.

Awards and medals will be presented at a luncheon Monday, March 7. Clyde B. Jenni, chief metallurgist, General Steel Castings Corp., Eddystone, Pa., will be presented the society's Technical and Operating Medal in recognition of outstanding contributions to the steel castings industry.

At the Tuesday session, a special panel of past society presidents and the incoming president will discuss "The Society in the Decade of the 60's." Members of the panel will be A. M. Andorn, chairman of the board and president, Penn Steel Castings Co., Chester, Pa.; H. A. Forsberg, vice president, Western Casting Sales, Foundry & Mill Machinery Div., Blaw-Knox Co., East Chicago, Ind.; and T. H. Shartle, president, Texas Electric Steel Casting Co., Houston, Tex.; and Mr. Moriarty, who will discuss market development.

Gray Iron Metallurgy Course Planned in Toronto by AFS

Ontario Chapter, American Foundrymen's Society, will sponsor a regional foundry training course on "Metallurgy of Gray Iron," March 16-18. The course will be given by the AFS Training and Research Institute at the King Edward Hotel in Toronto. It is planned for upgrading foundry supervision. Tuition for the course is $60, including luncheons and all instructional material.

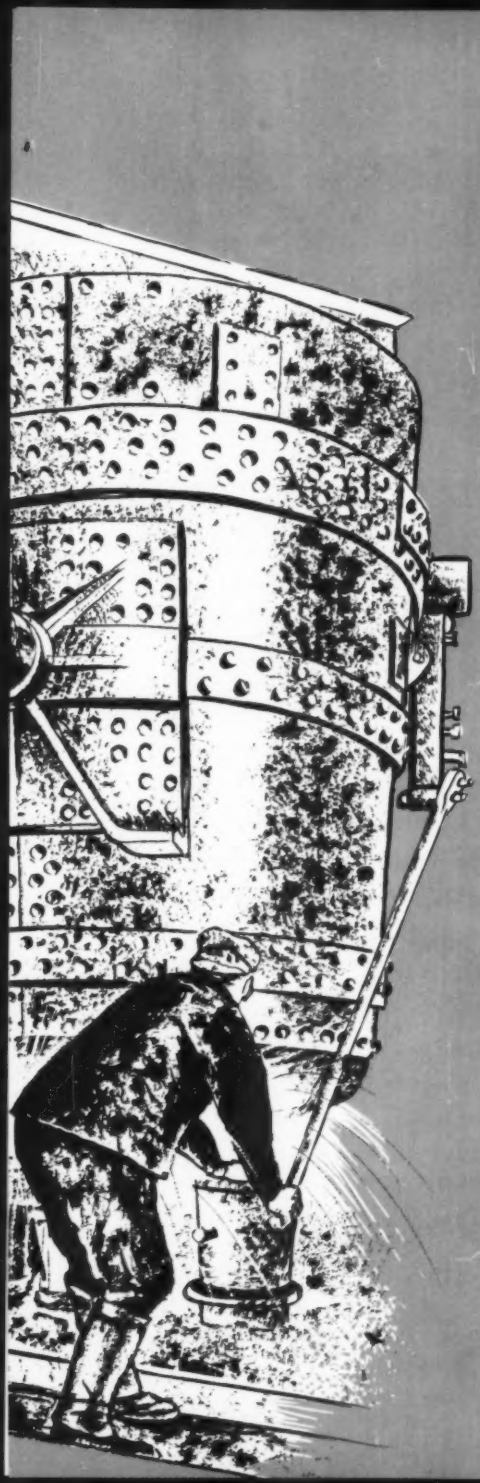
Applications must be made before March 2 with the director, AFS Training & Research Institute, Golf and Wolf Roads, Des Plaines, Ill.

Essay Contest Is Opened By Clark Equipment Co.

"Mechanize to Modernize" is the theme of the 1960 essay contest sponsored by Industrial Truck Div., Clark Equipment Co., and conducted by the American Materials Handling Society. First prize is $2000, and nine other total $3000.

Papers will be judged on analysis of subject, value in its field, originality, organization of material, and use of visual aids. Employees and dealers of Clark are not eligible for entry. All papers must be postmarked before midnight, April 1, 1960.

Complete details and rules can be obtained from local chapters of the AMHS or from Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich.



The Dynamic
Metal Casting
Industries

MEET THE CHALLENGE OF THE SOARING 60s

Announcing

A SPECIAL REPORT

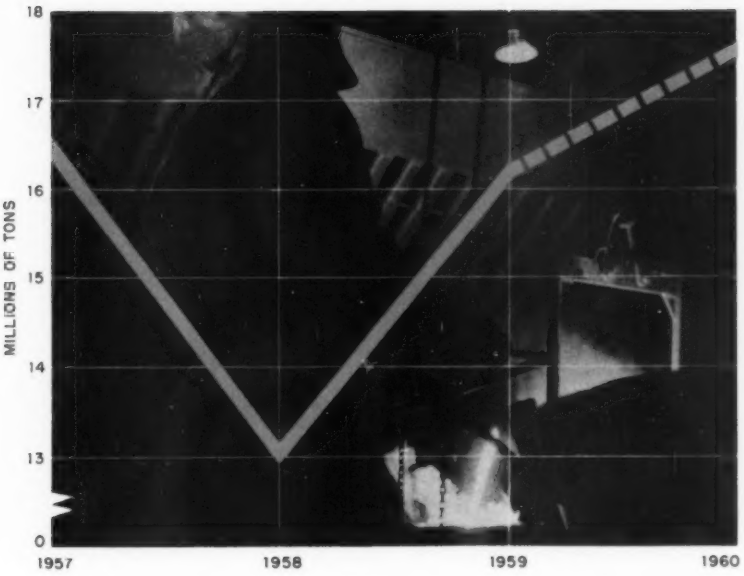
The Dynamic Metal Casting Industries

MEET THE CHALLENGE OF THE SOARING 60s

The editors of FOUNDRY announce plans for a special editorial report to the metal casting industries. This year's contribution to foundry planning is designed to help foundrymen share in the opportunities of the long-heralded decade of the Soaring Sixties. This editorial feature will appear in the May, 1960, Pre-Convention issue. The issue will be distributed immediately prior to the 64th Castings Congress and Foundry Exposition of the American Foundrymen's Society in Philadelphia, May 9-13.

Watch for this special 4-section editorial report in the . . .

MAY 1960 PRE-CONVENTION ISSUE **FOUNDRY**



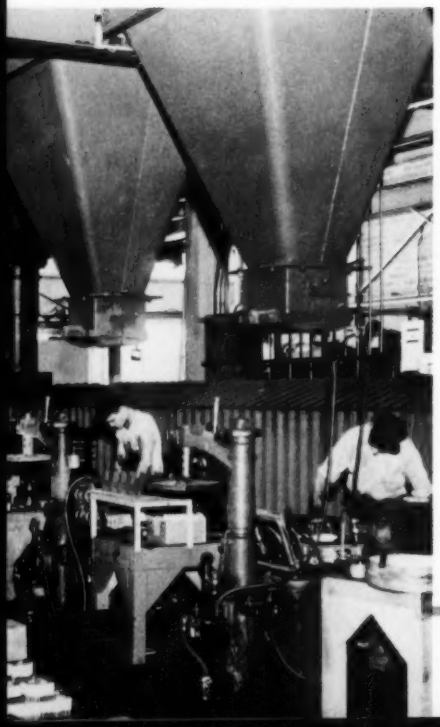
1

WHAT ARE FOUNDRYMEN PLANNING?

A report of an intensive study of foundry equipment purchases planned for the next two years will be made. Plant expansion projects by metal casting companies are an important part of this picture, and they, too, will be reported. Both large and small foundries will be included in this report, which will be of unusual interest as an indication of the manner in which foundrymen are gearing up for tomorrow's production needs.

Many hours of planning and discussion by the editors prepare the groundwork for presentation of the Pre-Convention issue report

2 INVENTORY OF FOUNDRY EQUIPMENT



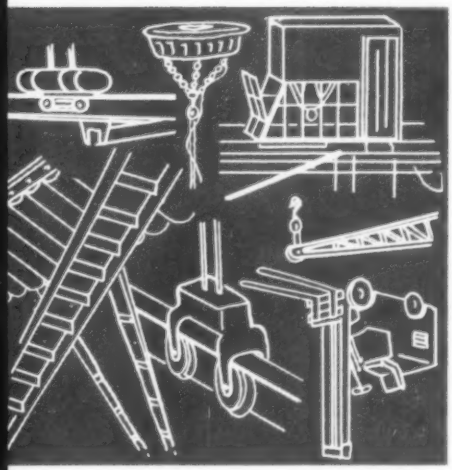
The editors and market research staff of FOUNDRY have joined forces to make this special study. (This inventory is conducted every five years.) It includes 65 different types of equipment in ten major categories. Use of equipment in different types and sizes of foundries, relative age of equipment, and other pertinent data will, as always, be of considerable interest to foundrymen—and to equipment makers whose function it is to fill metal casters' needs.

Market research staff members and editors co-operate closely

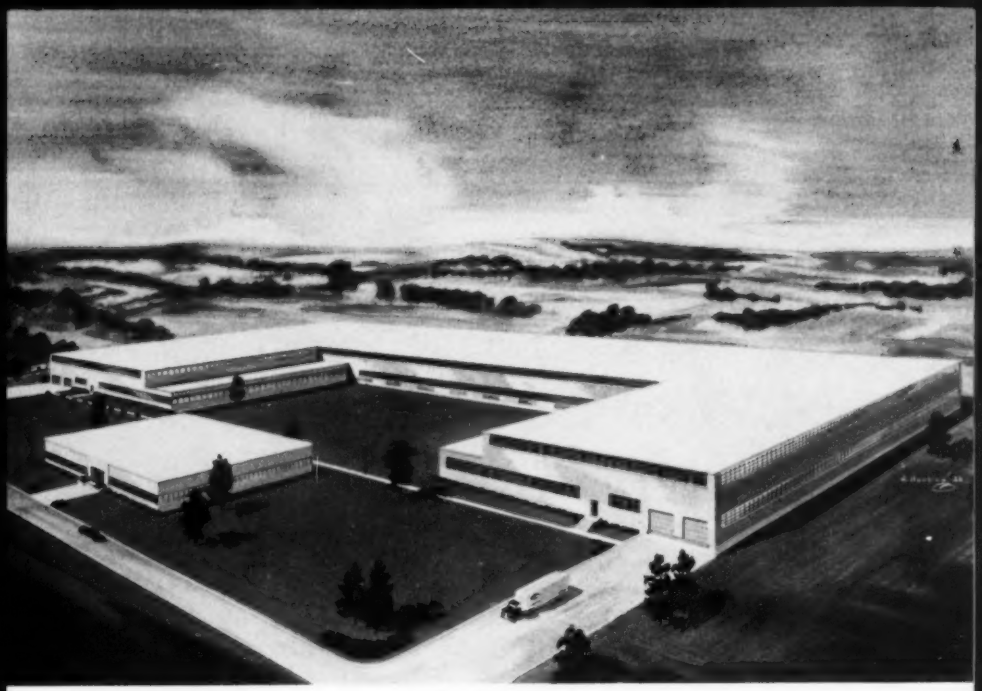
For easy reading and comprehension, illustrations are planned carefully

3

WHEN SHOULD FOUNDRYMEN PURCHASE EQUIPMENT?



The editors have asked representative manufacturers of foundry equipment to give their ideas on this important subject. Both general and specific information on when equipment should be replaced or additional units added will be presented. Attention will be given to the needs of both small and large plants.



4

WHAT FOUNDRIES CAN GAIN BY MODERNIZING

Modernization and mechanization of castings production equipment has been going on for many years. Now foundrymen are paying special attention to this avenue to increased profits. Indications are that the Soaring Sixties may truly be just the beginning of real modernization of facilities. The editors have chosen appropriate case histories of plants which *have* modernized successfully for presentation in this year's special editorial package.

FOUNDRY

FEATURES OF THE FIFTIES

FOUNDRY's editorial purpose is to serve the people who operate, manage, and buy for the metal casting industries by supplying them with helpful technical and economic information. Shown below are the key editorial reports featured in past Pre-Convention issues of FOUNDRY. These are a good example of the kind of useful information FOUNDRY's integrated editorial team provides some 75,000 foundrymen.

1959 . . . OPERATION MARKETING

Marketing Is Common Sense—Managing A Foundry Professionally—How To Achieve Profitable Growth—Good Casting Design Can Mean More Sales.

1958 . . . ARE YOU PAYING FOR EQUIPMENT YOU DON'T HAVE?

How Foundrymen Look At Equipment Replacement—A Modernization Program Can Pay Its Way—Property Depreciation Helps Finance Equipment Replacement.

1957 . . . FOUNDRIES CAN SELL MORE CASTINGS

Modern Methods and Materials Can Boost Sales—Research and Product Development Create New Markets—How To Build A Marketing Program—How We Sell More Castings . . . A Case Study.

1956 . . . TOOLS FOR TOMORROW'S PROGRESS

Improved Technology Can Gain Markets—Higher Efficiency Through Mechanization—Management Makes The Difference—Here's What Foundrymen Want From Equipment Manufacturers —What Manufacturers Predict For Equipment and Supplies.

1955 . . . FOUNDRY PROCESSES AND PRODUCTS

Molding—Melting—Metals—Testing—Heat Treatment.

64th CASTINGS CONGRESS and Foundry Exposition

American Foundrymen's Society
Convention Hall, Philadelphia

May 9-13, 1960

MAY PRE-CONVENTION ISSUE

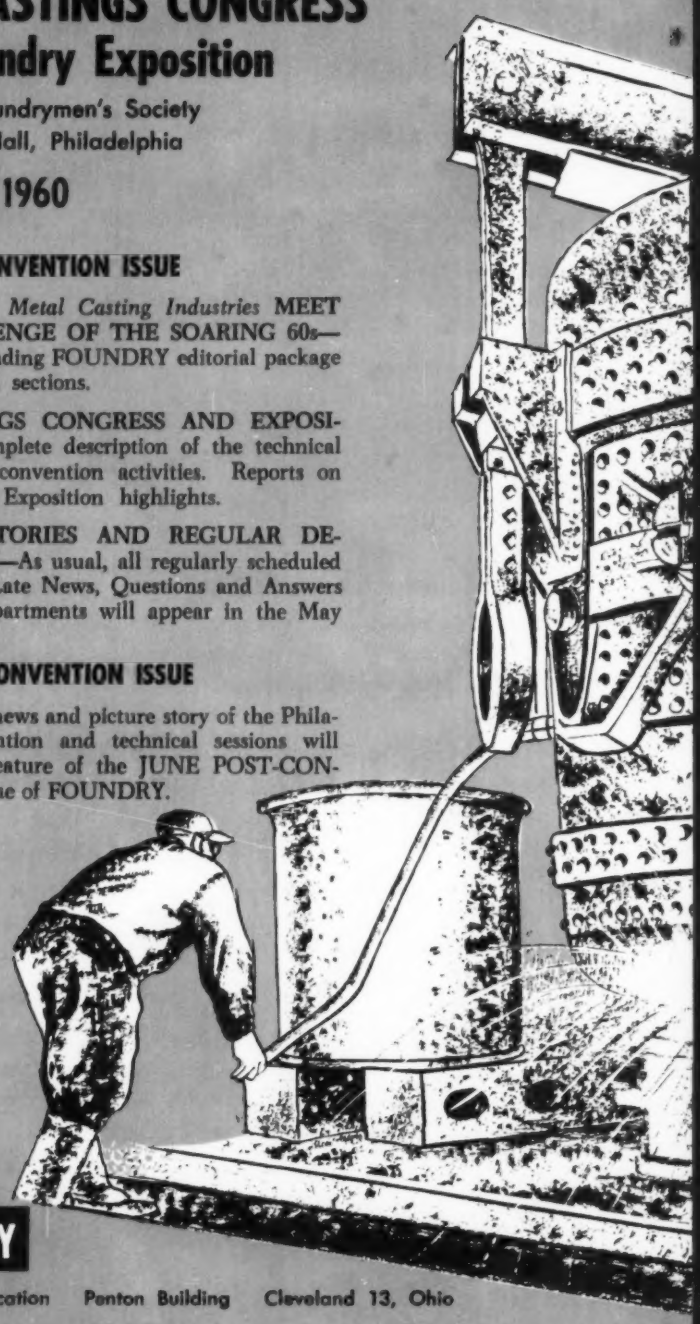
The Dynamic Metal Casting Industries MEET THE CHALLENGE OF THE SOARING 60s—A truly outstanding FOUNDRY editorial package in four special sections.

AFS CASTINGS CONGRESS AND EXPOSITION—A complete description of the technical program and convention activities. Reports on meetings and Exposition highlights.

FEATURE STORIES AND REGULAR DEPARTMENTS—As usual, all regularly scheduled features . . . Late News, Questions and Answers plus other departments will appear in the May issue.

JUNE POST-CONVENTION ISSUE

The complete news and picture story of the Philadelphia convention and technical sessions will be a special feature of the JUNE POST-CONVENTION issue of FOUNDRY.



FOUNDRY

A Penton Publication Penton Building Cleveland 13, Ohio

A muller operator adds dextrose, pure corn sugar, to a CO_2 molding sand mix. Batches of 400 lb are made

CO_2 Molding Sand Additive

. . . CASTING FINISH IMPROVES SHAKEOUT

By DAVID L. LONGEUVILLE
Foundry Technical Representative
Corn Products Sales Co., New York

● PIONEERING the use of an organic additive to CO_2 molding sand mixes, Washington Mould, Machine & Foundry Co., Washington, Pa., has obtained all the expected benefits to a marked degree —much better peel of sand from metal, with definitely improved surface finish of castings, as well as better collapsibility—without any adverse effects to offset these advantages.

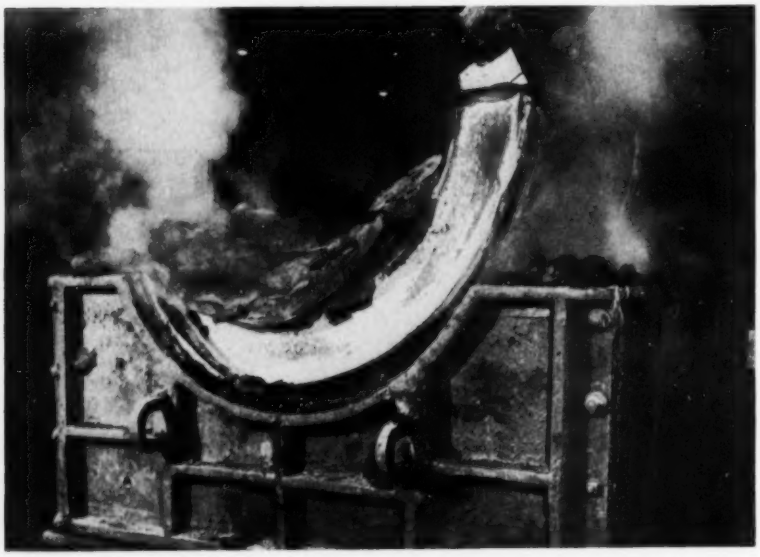
The literature of the foundry industry contains several references to the value of additions of organic material to sands for the sodium silicate CO_2 process. Previous papers and articles have mentioned the use of such carbonaceous materials as coal dust, wood flour, pelleted pitch, and graphite as additives. The purpose of these additions is to overcome the metal penetration, burnt-on sand, and poor collapsibility which were encountered by early users of the CO_2 process.

The additive used by the Washington company is dextrose, a pure corn sugar furnished by Corn Products Sales Co. under the trademark Cerelose—Code No. 2001.

In the experience of this foundry, dextrose is unusually effective in preventing the burning on of sand. It tends to overcome the layer of sintered sand that otherwise would adhere firmly to the face of the casting. It reduces and in many

Mold is gassed by inserting lance-type probes into holes preformed in the sand at 6 to 8-in. intervals. Rubber balls on the lance seal in gas

Gelling action of the CO_2 on sodium silicate hardens the mold. This mold is being gassed through a cup placed over the opening in the flask



Use of corn sugar additive substantially improves collapsibility. Burning out of the additive results in good peel of sand from metal

Paul Young, Washington Foundry superintendent, who furnished information used in this article, examines a casting made in a CO_2 mold

cases eliminates this fused layer where the sand comes in contact with the molten metal. The result is a better peel of sand from metal and improved surface finish of castings.

Mold Surface Shrinkage — One factor in this result is undoubtedly the increased shrinkage of molds containing the dextrose additive. This shrinkage, brought about by burnout of the additive, not only provides better peel but aids collapsibility. The dextrose begins to break down at around 350° F and is completely decomposed before reaching 600° F. As the dextrose burns out, it breaks the bond and effectively prepares the sand for easy shakeout.

The dextrose provides these benefits without causing an undesirable increase in friability of the sand or producing objectionable fumes. The material has proved economical to use, since additions of from 1 to 2 per cent are effective, compared with the 2 to 6 per cent recommended for some of the other carbonaceous materials.

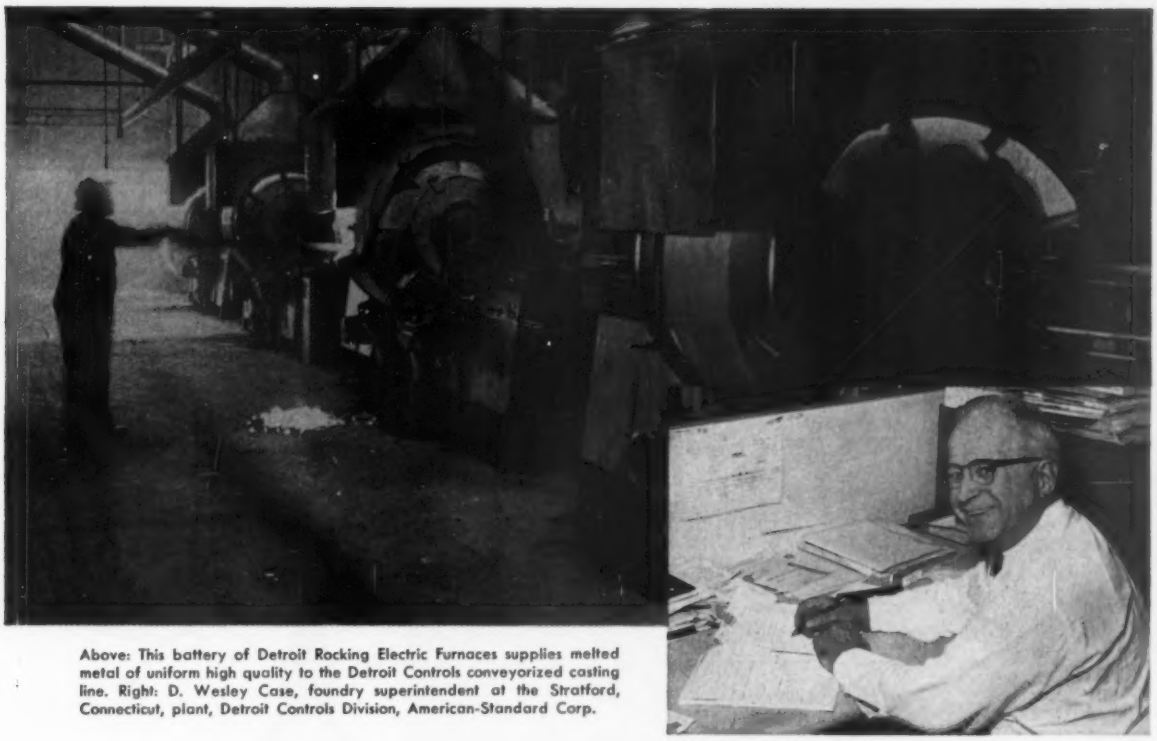
Washington Mould, Machine & Foundry Co. was established in 1917 and built its present foundry building in 1929. It conducts a jobbing operation, casting gray iron and ductile iron. Products include parts for steel mill equipment, maintenance items for the mills, castings for the aluminum refining industry, glass molds, and miscellaneous parts for original equipment manufacturers in other fields.

Most Runs Are Small

Quantities run mostly from one to twenty of a kind. From 16 to 30 tons of metal are poured daily in CO_2 sand molds for castings ranging in weight from 50 to 16,000 lb. Some speciality items made in CO_2 sand molds, however, weigh as little as one ounce. On the heavier side, several solid cylindrical rolls 9 ft long and 18½ in. in diameter were made in CO_2 molds with excellent results.

This foundry was one of the earliest users of the sodium silicate CO_2 process, trying it experimentally on cores. It was first put into production use on molds, however, and soon replaced all green sand floor molding at this foundry.

Speeds Rush Work—In general it has been found to be a faster



Above: This battery of Detroit Rocking Electric Furnaces supplies melted metal of uniform high quality to the Detroit Controls conveyorized casting line. Right: D. Wesley Case, foundry superintendent at the Stratford, Connecticut, plant, Detroit Controls Division, American-Standard Corp.

"Once the controls are set, Detroit Electric Furnaces automatically regulate for the most efficient performance."

Here's a new plant, planned and equipped for production line efficiency in the manufacture of brass and bronze valves and specialties. And to furnish melted metal of highest quality at speeds to match the efficiency of the rest of the plant, Detroit Controls Division of American-Standard Corporation chose Detroit Rocking Electric Furnaces.

"These furnaces," says D. Wesley Case, foundry superintendent, "practically eliminate the human element, with its possible errors, from the metal-melting process. Once the controls are set, the furnaces themselves regulate the degree of rocking and maintain the proper arc for the most efficient performance."

Fast, economical melts of uniform high quality and exact analysis are produced by Detroit Rocking Electric Furnaces in hundreds of foundries across the country. There's a size and type that's right for you, too. Find out now!

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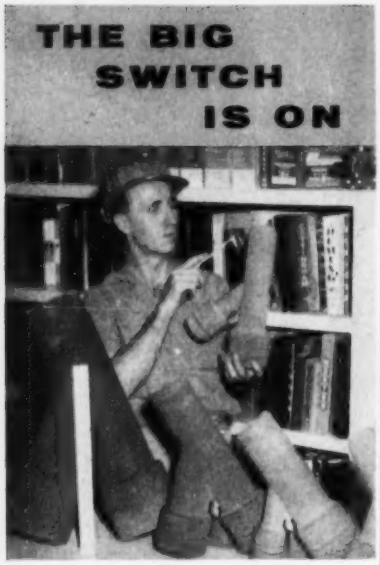
Kuhlman Electric Company • Bay City, Michigan

Foreign Representatives: in BRAZIL—Equipamentos Industrias, "Eisa" Ltd., San Paulo: CHILE, ARGENTINA, PERU and VENEZUELA: M. Castellvi Inc., 150 Broadway, New York 38, N. Y.; MEXICO: Cia Proveedora de Industrias, S.A. Apartado Postal No. 2783, Mexico 7, D.F., Mexico.

Furnace being loaded with 750 lbs. of bronze-based ingots. Only two men operate the battery of furnaces.

45 minutes from 750 lbs. of ingots to 750 lbs. of metal ready for the molds.

A mechanized line like this needs a constant supply of metal. And Detroit Electrics keep the ladles full.



BO JOHNSON, of Tyler Pipe & Foundry, Tyler, Texas, admires pipe fitting cores made with Acme's NEW liquid resin.

Tyler is one of the biggest and most modern soil pipe producers in the country. Because of their very high production rate, uniformity and reproducability are extremely important.

And now Acme Resin is used to eliminate Peel Back, Cracking and Caking in the production of these critical cores.

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ORIGINATORS OF RESIN COATED SAND
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1401 CIRCLE AVE. FOREST PARK, ILL.
(A Suburb of Chicago)

Circle 662 on Page 53

process, better suited to operations where there is a volume of rush work. Formerly, a number of molds had to be torched or oven dried before use. With the CO_2 process, no oven baking is required. Molds are ready for use immediately after the initial set has taken place, although if they are allowed to stand for a short time, considerable increase in strength occurs. The need for reinforcements is substantially reduced.

The CO_2 process makes it easier to maintain dimensional accuracy. In many instances, the weight of a casting in the 4000 to 5000 lb range has been reduced by 10 per cent due to firm mold dimensions. In addition, there are fewer problems with drop outs, swells or sags.

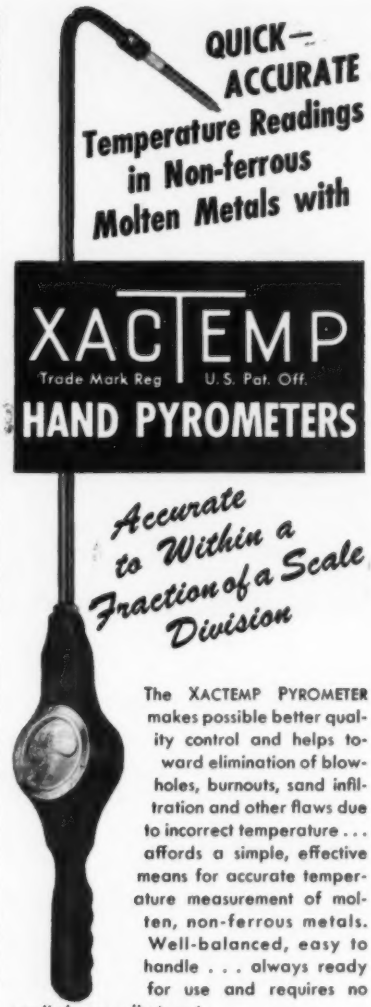
Moisture Controlled—In Washington Mould's experience a dry, clean sand, free from clay, is best suited to the CO_2 process. Small amounts of water are added to the sand/silicate mixtures. They tend to reduce the viscosity of the silicate and, within limits, have little serious effect. Moisture content must be held at a low level, however, and it is carefully controlled.

Sand temperature is important. A warm sand may cause premature gelling. The sand may come too hot as delivered. If so, it is allowed to cool to room temperature before it is used in CO_2 mixes. The sand is received by rail and moved by overhead crane from the main storage to working bins at the mulling station.

The same sand—a medium grade washed and dried lake sand—is used for both cores and mold facings. It averages approximately 50-60 AFS fineness. The foundry points out that coarser grades may be used in the CO_2 process and still achieve the same surface finish obtained from green sand molds.

Typical general purpose mixes at this foundry are as follows: Washed and dried lake sand, 50-60 AFS fineness, 400 lb; dextrose corn sugar additive, 1 to 20 per cent; duobinder, 1 per cent; sodium silicate, 4 per cent; water, ¼ to ½ per cent.

While this mixture may be considered basic, sand mixes are adjusted for section size, for coremaking or mold facings, and for finish requirements. In a typical day's run, an average of perhaps



The XACTEMP PYROMETER makes possible better quality control and helps toward elimination of blowholes, burnouts, sand infiltration and other flaws due to incorrect temperature . . . affords a simple, effective means for accurate temperature measurement of molten, non-ferrous metals. Well-balanced, easy to handle . . . always ready for use and requires no preliminary adjustments.

Cast aluminum and brass construction. Indicator is of medium resistance not affected by thermocouple length . . . acts rapidly . . . provided with Alnico V magnet and direct reading dial starting at 50° F. 43" stainless steel extension . . . standard 7" Marshall tip permits true readings below surface of metal. Made to give good service for years. Order at once to be sure of immediate delivery from stock.

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Circle 663 on Page 53

three different mixes will be used.

A small quantity, 1 to 2 per cent, of the dextrose additive has been found adequate. The corn sugar is easy to use in the foundry. Due to its small and uniform particle size, it disperses quickly and uniformly in the sand. Since it tends to retain the initial moisture in the mix, it retards drying of the sand before gassing, and extends the bench or floor life of the sand. The mixes have good flowability and the required green strength for jobs where patterns are removed before gassing.

Mullers are of the heavy wheel type, with rotating bowl. Batches of 400 lb are made, and care is taken not to overmull. Too much mulling exposes the sand grains to the air unnecessarily, and warms up the sand so that it air dries too fast.

Mulling cycle is as follows: Sand, dextrose, duo-binder 1 to 1½ minutes, dry; sodium silicate added 1½ to 2 minutes, wet; water added ½ minute, wet—total mulling time 3 to 4 minutes.

Gassing Equipment — The CO_2 gas is generated in a 7000-lb liquid unit. The liquid storage tank is equipped with both heating and refrigerating units to control the temperature. Piping distributes the gas to 14 molding stations and 8 coremaking stations. Some of the latter can also be used for molding. Gas pressure is controlled at 35 psi by regulators at the stations.

Hoses carrying the gas to individual molds are attached to the regulators. Hose lines are equipped with snap type couplings for attaching cups or lance probes as desired. Gassing is done by placing the rubber cup over an opening in the flask or by inserting the lance into holes previously formed in the sand, approximately 6 to 8 in. apart.

The molds are hardened by the gelling action of the CO_2 on the sodium silicate, which is broken down by the gas to form a colloidal silica gel with high bond strength. The initial set gives a strength in the range of 200 to 300 psi, which in most cases is adequate for immediate use of the molds.

Gassing time also is controlled carefully. Overgassing is avoided since it tends to produce a friable

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NOW ROTOBLAST STEEL SHOT
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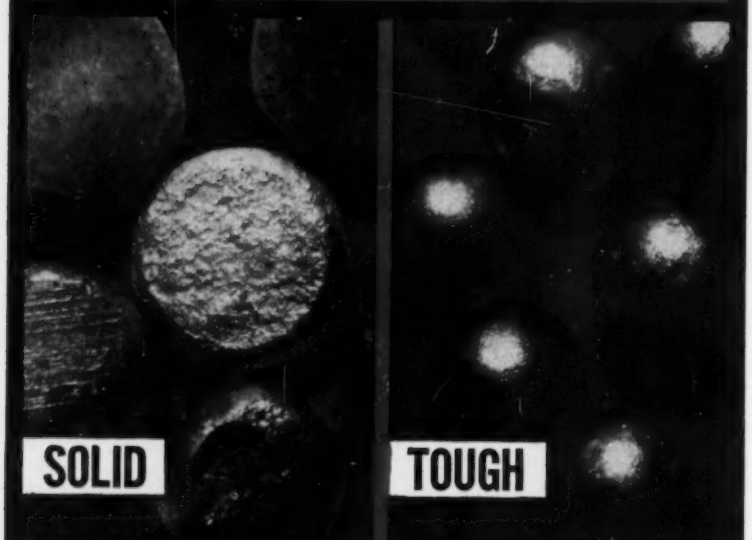

Rotoblast Steel Shot has already stacked up an impressive record of reduced costs in foundries* and blast cleaning departments* from coast to coast!

- Atlantic Coast steel foundry—Compared with premium abrasive formerly used, Rotoblast Steel Shot cuts abrasive costs *in half*—and gives better cleaning than before!
- Southwestern manufacturing company—Now uses 7 lbs. of Rotoblast Shot per wheel hour, compared to 23 lbs. of malleable shot previously used!
- Large automotive foundry — Rotoblast Shot consumption 30% less than other steel shot tested; cleans castings faster!
- Eastern steel plant—Now uses Rotoblast Shot to descale steel strip, after exacting lab tests proved it better than previous steel abrasives!
- Midwest forge shop—Found Rotoblast Shot reduced abrasive costs 23% below that of abrasives previously used!
- Steel tank company—Cut cleaning costs in half (from 4c to 2c per sq. ft.) when it switched to Rotoblast Steel Shot.

These examples are just some of the many proving Rotoblast's cost-cutting qualities! Arrange a trial in your plant! Talk to your Pangborn man or write PANGBORN CORPORATION, 1400 Pangborn Blvd., Hagerstown, Maryland. *Manufacturers of Blast Cleaning and Dust Control Equipment—Rotoblast Steel Shot and Grit.*

*Names available on request

Pangborn ROTOBLAST® STEEL SHOT AND GRIT

surface, particularly at edges, which may erode under the action of molten metal.

Some molds are washed after gassing to help resist metal penetration. An alcohol base wash is used and is torched off to skin dry these molds.

In summary, the most important benefit derived from the addition of the dextrose to the sodium silicate sand mix is the noticeably better peel of sand from metal after pouring. Surface finish is definitely improved. Grinding that would be required to remove burned on sand from the face of the casting has been substantially reduced. Reduced finishing has been accompanied by a reduction in the foundry's scrap loss.

The second noteworthy benefit is the improved collapsibility and easier shakeout. Burning out of the additive after solidification begins shrinks the molds away from casting surfaces, breaks the bond, and thus improves shakeout.

These substantial benefits are realized at economical cost for the additive used, and without unwanted side effects.

Heating Equipment Builders Hold Annual Winter Meeting

W. E. Benninghoff, vice president and Tocco Div. general manager, Ohio Crankshaft Co., Cleveland, was elected president of the Indus-

W. E. BENNINGHOFF
IHEA President

trial Heating Equipment Association at its annual winter meeting in Philadelphia, Jan. 18-19.

The two-day gathering, with about 125 in attendance, was devoted to discussion of general prob-

lems of the industry and to meetings of the association's individual committees and divisions.

The industrial heating equipment industry experienced a sharp recovery in business during 1959. Net orders of association members for the year totaled about $107 million, more than double the 1958 volume, according to Robert E. Fleming, executive vice president of IHEA. In addition, orders for induction heating equipment of nearly $16 million showed a similar increase.

Other officers elected at the meeting included: Vice president, H. J. Pugsley, senior vice president, Swindell-Dressler Corp., Pittsburgh; treasurer, Roy R. Snyder, treasurer, W. S. Rockwell Co., Fairfield, Conn; executive vice president, Robert E. Fleming, Washington. C. J. Schmidt, executive vice president, J. O. Ross Engineering Div., Midland-Ross Corp., New York, was elected to the executive committee and board of directors. Other new directors are the following:

W. T. Bosworth, vice president, Salem-Brosius Inc., Pittsburgh; W. J. Parsons, senior vice president, Pacific Scientific Co., Los Angeles; R. C. Cheek, manager, Industrial Electronics Dept., Westinghouse Electric Corp., Baltimore; C. A. Barnett, president, Foundry Equipment Co., Cleveland.

Senator Hugh Scott, Pennsylvania, addressed the association's annual banquet on opportunities in the expanding market for capital equipment. At the opening general session, Allen S. Oram, United States Steel Corp., spoke on "Influence of Foreign Competition on American Industry," and Horace Drever, president Drever Co., discussed "Industry Heating Equipment in World Markets."

The subect of marketing was treated at the second session in talks by Richard H. Groves, *The Iron Age*, on "Markets and Buying Processes for Industrial Heating Equipment," and by Dr. F. Robert Shoaf, New York University, on results of a study by *Steel* on "Emotional Factors Underlying Industrial Purchases."

Henry G. Magnussen, Metalworking Equipment Div., BDSA, U. S. Department of Commerce, described activities of this division and the services which BDSA has available for industry.

ROTOBLAST CUTS CLEANING TIME 42%

Pangborn Rotoblast reduces cleaning time from 12-15 minutes per 2,000 lb. load to 7 minutes at Ingersoll-Rand

At Ingersoll-Rand Co., Painted Post, N.Y., blast cleaning loads weigh 2,000 lbs., include castings up to 300 lbs. each. To handle these loads efficiently, Ingersoll-Rand replaced its old blast cleaning barrel with a new Pangborn Rotoblast Barrel . . . and benefited *three* ways!

Cleaning quality is "incomparably better." Maintenance time and costs have been drastically cut. (For example, wheel vanes previously lasted 12 to 15 blast hours, now last 70 blast hours.) And cleaning time per load has been reduced from 12-15 minutes to only 7 minutes! Cleaning production now exceeds 10,000 lbs. per hour, cutting 7½-hour days to 3 and 4-hour days in the cleaning department.

For full details on how Pangborn Rotoblast can save you money, write: PANGBORN CORPORATION, 1400 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Blast Cleaning and Dust Control Equipment—Rotoblast Steel Shot and Grit.*®

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. . . Central Foundry Div. promotions

Jefferson J. Davis has been named executive vice president, Electric Steel Foundry Co., Portland, Oreg. With the company over 20 years, in 1954 he became vice president in charge of product divisions. **Ed T. Hewitt**, since 1949 general manager of the company's International Division, has been named division vice president. He continues as manager of the eastern sales district in New York.

John F. Torley has been appointed vice president, manufacturing, Industrial Div., National Malleable & Steel Castings Co., Cleveland. **William Jost Jr.**, formerly general superintendent, has succeeded Mr. Torley as manager of the Chicago Works. Mr. Torley joined the Sharon, Pa., Works in 1946. Mr. Jost started at the Melrose Park, Ill., Works, in 1939.

C. L. Fell, vice president of marketing, American MonoRail Co., Cleveland, was elected president of the Material Handling Institute recently. Other officers include **Robert F. Moody**, general sales manager, Hyster Co., Portland, Oreg., first vice president, and **Bert E. Phillips**, manager of the Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich., second vice president.

Lawrence Kennedy has been appointed melting superintendent, Cleveland Foundry, Ford Motor Co., Berea, Ohio, succeeding **Ralph Barker**, who has resigned. Mr. Kennedy joined the company in 1953, became melting department foreman, and was named acting superintendent last August.

Robert F. Galvin, president, Ohio Steel Foundry Co., Lima, Ohio, has been re-elected a trustee of the Ohio Manufacturers' Association.

Robert D. Ahles has been appointed manager of manufacturing for the Schenectady Foundries, General Electric Co., Schenectady, N. Y., succeeding **John E. Waugh**, who has been with the company since 1927. Mr. Waugh has been named manufacturing consultant of the foundry department until his retirement in April. Mr. Ahles, since 1956 manager of product engineering for the foundry department, joined the company in 1946.

Gaylon D. Robinson, formerly with New Castle Products, New Castle, Ind., has joined Pangborn Corp., Hagerstown, Md., as abrasive sales engineer for the Chicago district.

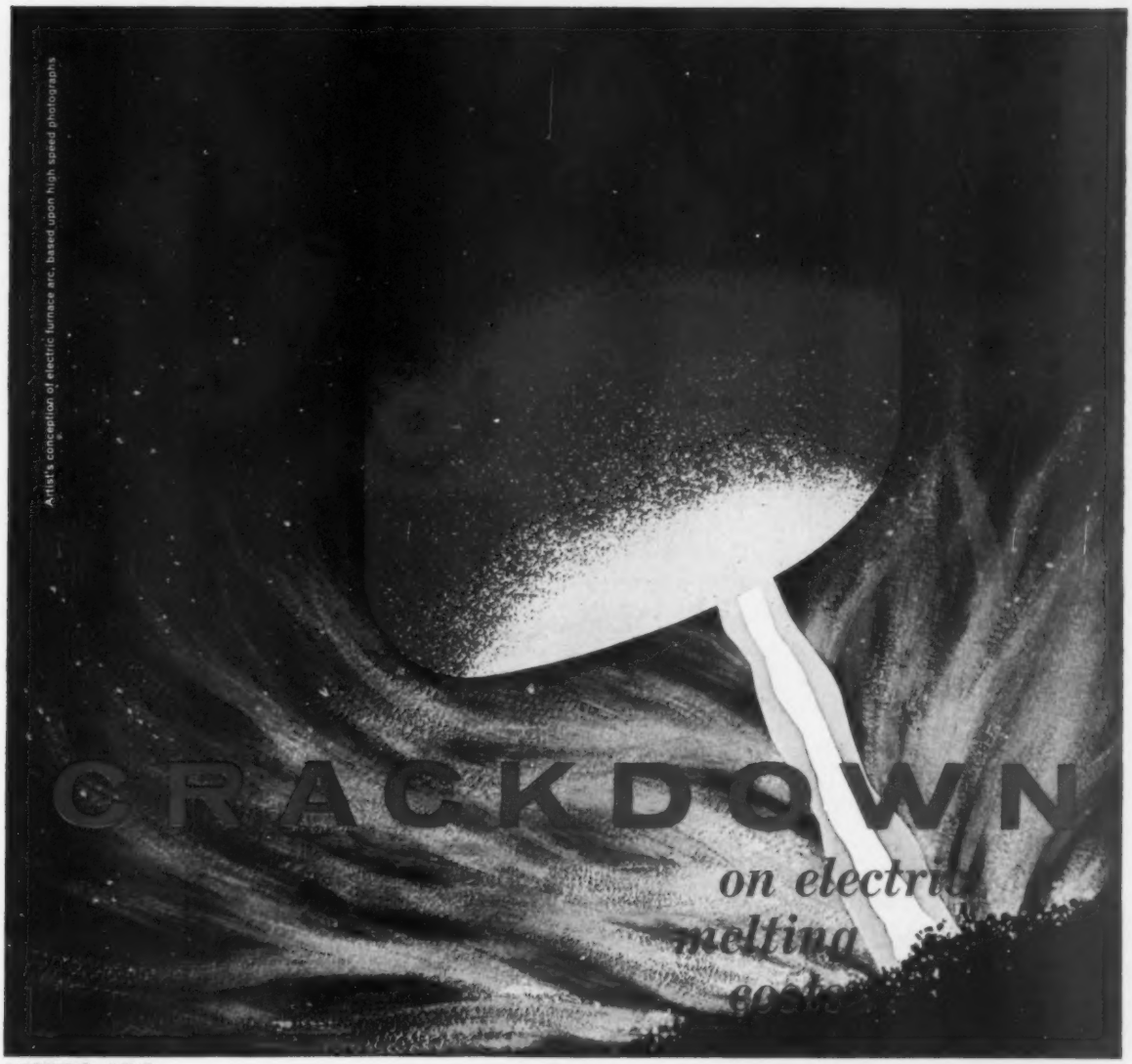
John V. Houston Jr., formerly with American Brake Shoe Co., New York, has been appointed assistant manager of West Coast sales and development, Climax Molybdenum Co., Div. of American Metal Climax Inc., New York, with headquarters in the Los Angeles office.

Elmer E. Braun, manager of ferrous metals operations, Central Foundry Div., General Motors Corp., has been appointed works manager, responsible for ferrous and nonferrous metals operations in all five plants of the division. He joined the Saginaw Malleable plant in 1933. **Robert L. Newtson** has been made manager of the Fabricast plant, Bedford, Ind., replacing **Edgar A. Wondracheck**, who has been transferred to overseas operations. Mr. Newtson has been production manager at Bedford. **George A. Zink**, formerly manager of nonferrous metals operations for the division, has been named director of process development for the Defense Systems Div., Warren, Mich.

Lee P. Burgess has been named vice president, Belcher Malleable Iron Co., Easton, Mass. He joined the company last year after 21 years at Wire Rope Corp. of America, St. Joseph, Mo.

J. A. Pierce has been named manager of technical sales, Harbison-Walker Refractories Co., Pittsburgh. He has been a member of the technical sales department since 1951.

Roger H. Kottke has been appointed group leader in charge of the foundry research and development laboratory, Archer-Daniels-Midland Co., Minneapolis. A member of the foundry product research



HYDRO-ARC electric furnaces keep arcs burning at peak intensity every moment—and turn extra wattage into melt. The key: instantaneous electrode movement, monitored by the very *energy* of the arc itself.

Air counterbalanced electrodes and a unique dual motor hydraulic control circuit virtually eliminate troublesome inertia or mechanical lag. When turbulance in the metal charge effects arc gap, electrode reaction is immediate—readjustment is exact! Here is electric melting efficiency you may not have thought possible . . . cost reductions that open many new applications for fast, clean, economical electric melting. Hydro-Arc may put a fresh light on your own plans for additional melting, smelting, or other heating facilities.

FOR MORE FACTS, write for Hydro-Arc Bulletin No. FO-10, or ask a Whiting furnace engineer to call. No obligation. *Whiting Corporation, 15607 Lathrop Avenue, Harvey, Illinois*

87 OF AMERICA'S "FIRST HUNDRED" CORPORATIONS ARE WHITING CUSTOMERS

ELECTRIC FURNACES

WHITING

MANUFACTURERS OF CRANES; TRAMBEAM HANDLING SYSTEMS; TRACKMOBILES; FOUNDRY, RAILROAD, AND SWENSON CHEMICAL EQUIPMENT.

Circle 667 on Page 53

J. G. DICK

C. W. SCHRAM

. . . Canadian Bronze Co. promotions

TED V. LINABURY

LESTER A. BERKHOLTZ

. . . Miller & Co. appointments

staff since he joined the company in 1956, he was formerly project leader in the foundry laboratory.

J. G. Dick, formerly district manager, Montreal Bronze Ltd., Div. of Canadian Bronze Co. Ltd., Montreal, Que., has been appointed manufacturing manager of all divisions of the parent company. **C. W. Schram,** assistant district manager, has been named manager of Montreal Bronze.

David H. Mogill has been appointed Atlanta district sales manager, Kaiser Aluminum & Chemical Sales Inc., Oakland, Calif. He has been superintendent of planning at Kaiser's Ravenswood, W. Va., Works.

Edward H. King, president, Hill & Griffith Co., Cincinnati, has been elected president of the Foundry Facing Manufacturers' Association for 1960-61. **Lester M. Cohn,** treasurer and director of S. Obermayer Co., Chicago, was named vice president.

Philip S. Hill, executive vice president, Hyster Co., Portland, Oreg., has been elected president of the Industrial Truck Association. **Roy L. Wolter,** general manager Automatic Transportation Co., Chicago, was named vice president. **L. West Shea,** Hanson & Shea Inc., Pittsburgh, is executive secretary-treasurer of the association.

William H. Searles has been appointed treasurer, Bunting Brass & Bronze Co., Toledo, Ohio, succeeding **Walter F. Volk,** who continues as vice president. Mr. Searles has directed market research for the company.

Dr. Walter A. Dean has been named assistant director of research, Aluminum Co. of America, Pittsburgh, succeeding **William T. Ennor** who has retired after 35 years of service.

Dale B. Lupton recently joined the research and development department, Chas. Taylor Sons Co., Cincinnati, as a ceramic engineer.

Ted V. Linabury and **Lester A. Berkholtz** recently joined Miller & Co., Chicago. Mr. Linabury will have headquarters in Chicago as a sand consultant. As resident manager in Milwaukee Mr. Berkholtz will cover Wisconsin and northern Michigan.

Robert Harkins has been named sales representative, Induction Heating Corp., Brooklyn, N. Y. He will assist **Harold Ottobrini,** New England sales representative for the company. Mr. Harkins will work principally in Rhode Island and Connecticut.

Grover L. Michael, since 1951 president, McConway & Torley Corp., Pittsburgh, has retired. He will continue as a director of Ellicott Machine Corp., Baltimore, the parent company. **Richard E. Bowe,** secretary and treasurer, has been elected president and treasurer. Mr. Bowe also serves as secretary-treasurer, Ellicott Machine Corp., and president, Ellicott Fabricators Inc., a subsidiary. **Donald Y. Clem,** ex-

LESTER M. COHN

EDWARD H. KING

. . . FFMA officers

DONALD Y. CLEM

RICHARD E. BOWE

. . . McConway & Torley executives

Gray Iron Foundry Milestones—No. 2

CREATED in China in 935 A.D., the cast iron Lion illustrated above still stands as a tribute to the craftsmanship of the pioneering Chinese foundryman.

Iron was first cast in China about 700 B.C., and although the Chinese were not the first to produce the metal, they developed advanced founding techniques. Their box-bellows furnace, for example, was the most efficient melting implement of the era. And their discovery that the introduction of carbon significantly reduced the melting point of the iron, was a milestone in the history of founding.

Today, the progressive Gray Iron Industry contributes significantly to the nation's industrial growth by creating essential products which range in size from the smallest gear to the largest steel mill roll.

As a supplier of quality foundry coke and pig iron, Pittsburgh Coke & Chemical Company is proud to contribute to the continuing growth of the great Gray Iron Foundry Industry.

Reproductions of the "China's Iron Lion," suitable for framing, may be obtained without charge by writing to the Coke & Iron Division, Pittsburgh Coke & Chemical Company, Grant Building, Pittsburgh 19, Pennsylvania.

1427

Neville Pig Iron and Neville Coke for the Foundry Trade

PIG IRON • COKE • FERROMANGANESE • CEMENT • COAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON

DENNIS R. HYNES
. . . joins Industrial Furnace

ROBERT W. GOSSARD

HERBERT J. NIEMANN
. . Pangborn district mgrs.

BURLEIGH E. JACOBS Jr.
. . . pres., Grede Foundries

ecutive vice president, has also been elected secretary and a director of McConway & Torley.

Dennis R. Hynes has joined Industrial Furnace Co., Div. of AAA Machinery & Equipment Co., Cleveland, as general manager and director of sales engineering. He was formerly with Joe Martin Co., Detroit. The division stocks used, rebuilt, and new furnaces.

George L. Mitsch, formerly plant manager of the St. Louis foundry, American Car & Foundry Div., ACF Industries Inc., New York, has been named vice president and general manager, A. Kilpatrick & Sons Foundry Co., St. Louis. Mr. Mitsch has been active in committee work of the Gray Iron Founders' Society.

L. R. Stallings has been appointed special products manager of sales, Union Carbide Metals Co., a division of Union Carbide Corp., New York. He was formerly manager of sales development with the company's Silicones Division.

Robert W. Gossard and **Herbert J. Niemann** have been named managers of the Milwaukee and Indianapolis districts recently formed by Pangborn Corp., Hagerstown, Md. Mr. Gossard was head of the Wisconsin branch in Chicago and Mr. Niemann has been sales engineer there. **J. Donald FitzGerald,** formerly with Copperweld Steel Co., in Cleveland, has been named an abrasive sales engineer there for Pangborn.

William J. MacNeill, recently a foundry consultant with Westover Corp. & Associates, Milwaukee, has been appointed works manager, Federal Malleable Co. Inc., Milwaukee. Previously he held executive positions with Dayton Malleable Iron Co., Dayton, Ohio, Badger Malleable & Mfg. Co., South Milwaukee, Wis., and Federal Malleable Co., predecessor of the present corporation. A former president of Wisconsin Chapter of the American Foundrymen's Society, Mr. MacNeill also served as a national director.

Burleigh E. Jacobs Jr. has been elected president, Grede Foundries Inc., Milwaukee, succeeding **William J. Grede,** who has become chairman of the board. **Arthur L. Grede** has been named vice chairman and continues as first vice president. Mr. Jacobs joined the company in 1945, and after various manufacturing and sales assignments, became vice president last year. Other officers and directors of the company were re-elected.

Harry G. Schwab, plant superintendent, Bunting Brass & Bronze Co., Toledo, Ohio, has been made director of manufacturing for operations there and at the Kalamazoo, Mich., plant. He has been with the company for 20 years.

William B. Wallis has been named consulting engineer, Strategic Materials Corp., New York, where he will assist in the promotion of the Strategic Udy process. He recently resigned after 21 years as president of Lectromelt Furnace Div., McGraw-Edison Co., Pitts-

L. R. STALLINGS
. . . special products mgr.

WILLIAM J. MacNEILL
. . . Federal works mgr.

HARRY G. SCHWAB
. . . mfg. operations director

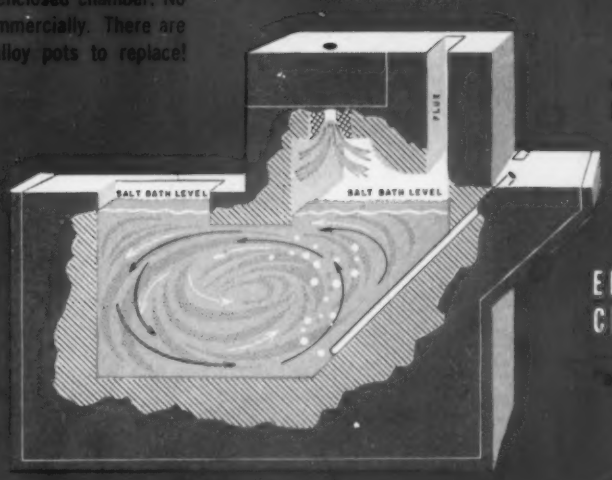
WILLIAM B. WALLIS
. . . joins Strategic Materials

NOW! AJAX ANKERSEN FUEL-FIRED FURNACES!

LOW-COST RADIATION HEATING OF SALT
. . . from bath surface in enclosed chamber. No other furnace does this commercially. There are no heating elements or alloy pots to replace!

NO SCALE!
NO DECARB!

UNIFORM WORK AREA TEMPERATURE
. . . comparable to electrode-type salt baths



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EFFECTIVE BATH CIRCULATION
. . . obtained by patented "air bubbler" agitator

OPERATES AT ANY HEAT FROM 350° to 2300°F with use of proper salts

STURDY, TROUBLE-FREE CONSTRUCTION
All of the accumulated Ajax experience in pioneering salt baths and creating the world's largest line has endowed Ajax-Ankersen furnaces with every modern feature for maximum safety, dependability and economy

Salt Bath "Work Horse" for Tonnage Production!

Not since the commercial introduction of salt baths by Ajax Electric Company 27 years ago, has there been a salt bath furnace development of greater importance to many users than this one!

By combining the cost advantages of gas or oil fuels with the heat treating superiority of molten salt immersion, Ajax-Ankersen furnaces pave the way for the use of fuel-fired baths in applications where they were heretofore impractical.

Besides all ordinary heat treating operations, manual or mechanized, Ajax-Ankersen fuel-fired furnaces in suitable designs lend themselves readily to high tonnage production such as heating for forging and other "heavy duty" applications.

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PIONEERS IN SALT BATH HEAT TREATING PROGRESS

WRITE for Bulletin 200 giving details and outlining the scope of Ajax-Ankersen fuel-fired salt bath designs for many uses.

AJAX ELECTRIC COMPANY
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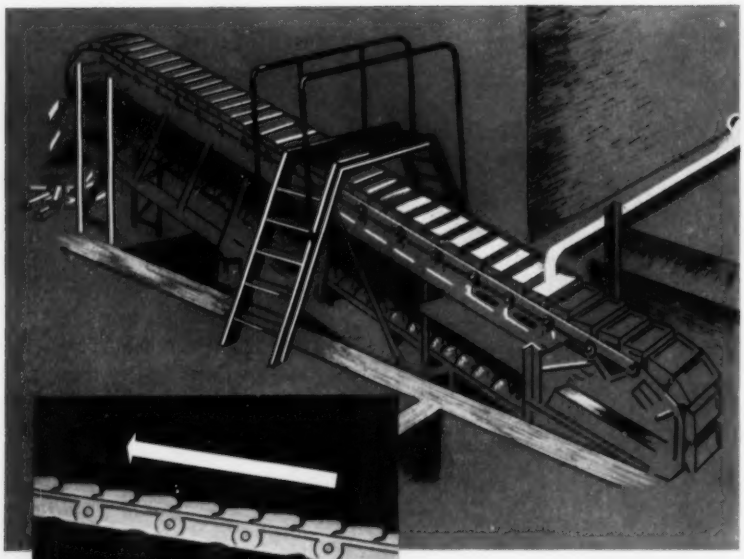
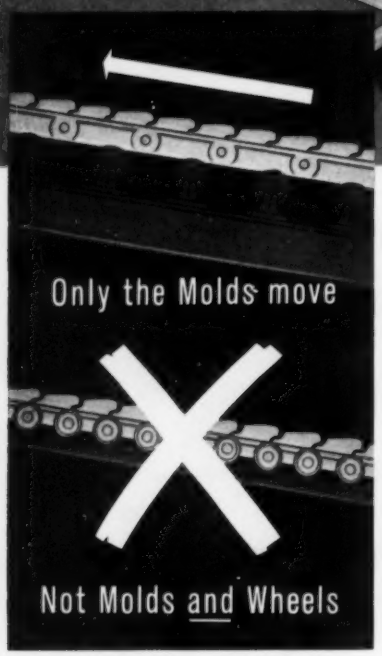
AN INDEPENDENT PRODUCER OF SALT BATH FURNACES EXCLUSIVELY





Let STATIONARY WHEELS Reduce your Pig Casting Costs

Eliminating 80% of the parts of conventional pig casting machines, this simplified design results in sharp reductions of lost production time and maintenance costs. Since the idler wheels are mounted on anti-friction bearings on the stationary part of the frame, not on the molds, they are positioned as far as possible from hot metal.

Capacities for the machine illustrated: from 3 to 50 tons per hour. Sizes: 15 to 125 feet. Other Bailey Pig Machines are made in single and double strand types and in capacities to 250 tons per hour. Both types feature stationary wheel construction.

WILLIAM M. Bailey COMPANY
ENGINEERS
LEADERSHIP THROUGH QUALITY
1221 BANKSVILLE ROAD PITTSBURGH 16, PA.

burgh. Previously he had been a consulting engineer with W. E. Moore & Co., there. Mr. Wallis is a past president of the American Foundrymen's Society and the Foundry Equipment Manufacturers Association.

Paul Schroeder has been appointed vice president of manufacturing, Kensington Steel Div., Poor & Co., Chicago. He joined the company in 1950 as industrial engineer, and was made plant superintendent last June.

Louis W. Jander, formerly assistant general sales manager, has been named general sales manager, Materials Handling Div., Yale &

LOUIS W. JANDER
. . . general sales mgr.

Towne Mfg. Co., Philadelphia, succeeding **Clyde R. Dean,** who has become division general manager. Mr. Jander joined the company in 1956 as regional sales manager for the division. **Gerald A. Tamblyn** has been appointed assistant general sales manager of industrial trucks. **Robert L. Brown** will direct industrial tractor shovel sales. **Francis O. Boufford** has been made New York branch sales manager. Since 1956 he has been western regional manager.

Richard G. Caulton has joined Apex Smelting Co., Chicago, as sales engineer with headquarters at the Cleveland plant. Until recently he was a manufacturers' representative in the Michigan area.

James G. Weber has been appointed director of engineering and manager of the quality control department, Motor Castings Co., Milwaukee. **George P. Antonic** has been named general superintendent,

APPROVED

for better grinding

SIMONDS SNAGGING WHEELS

Better grinding evident in fast stock removal with less wheel wear! That's why Simonds Snagging Wheels get the nod of approval in leading foundries, steel mills and metal-working plants. Resinoid bonded wheels contain a special additive that provides an internal lubricant for better grinding action . . . and are identified by new short markings, A166-R, C16-S, etc. Vitrified bonded wheels for gray iron contain V9 Bond, a chemically designed glass bond for greater uniformity and consistently superior performance.

Write for Bulletin ESA-305

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Division of Simonds Saw and Steel Co.
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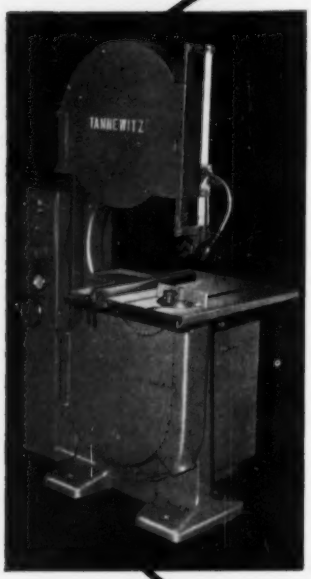
FAST SERVICE • LOCAL STOCKS

WEST COAST PLANT: EL MONTE, CALIF.—BRANCHES: CHICAGO • DETROIT • LOS ANGELES • PHILADELPHIA • PORTLAND, ORE. • SAN FRANCISCO
SHREVEPORT—IN CANADA: GRINDING WHEELS DIVISION, SIMONDS CANADA SAW CO., LTD., BROCKVILLE, ONTARIO • ABRASIVE PLANT, ARVIDA, QUEBEC



TANNEWITZ BAND SAWS are Fast, Stand up under toughest usage!

Replacing your old band saws, used in cutting off gates and risers of ferrous and non-ferrous castings, with Tannewitz Band Saws is one of the best dividend-paying investments you can make. They cut many times faster, reduce down-time and repairs to almost nothing, pay for themselves in short order. Available in 24" to 52" wheel sizes with variable speeds from 60 to 15,000 FPM, or single speed to suit your particular production requirements as established by testing of your materials in our factory. Write or phone for details.

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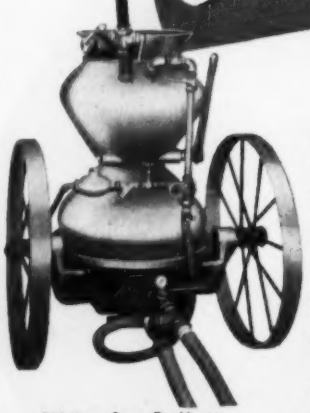
Circle 672 on Page 53

Save! ON FURNACE REPAIR and REFRACTORY INSTALLATION



THE "CEMENT GUN"® METHOD

The CEMENT GUN is simple to operate; two or three of your own men can learn quickly and easily, after which they can make all your refractories repairs. With the CEMENT GUN they can place a lining 1" to 6" thick in one continuous operation. They can make patches in a "hot" furnace. They can place up to 5 thousand pounds of refractory material an hour. The CEMENT GUN method saves down time, saves material and extends the life of your present linings. Write today for further information.

Write for Bulletin No. 3000-B Today!

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succeeding **Frank M. Kulka**, who has retired, after 32 years of service. Mr. Antonic has been superintendent of the company's Plant 1, West Allis, Wis., since 1950. Mr. Weber was formerly with Walter Gerlinger Inc., Milwaukee.

Albert E. Cudlipp, vice president, Lufkin Foundry & Machine Co., Lufkin, Tex., has been appointed a director of the Federal Reserve Bank of Dallas.

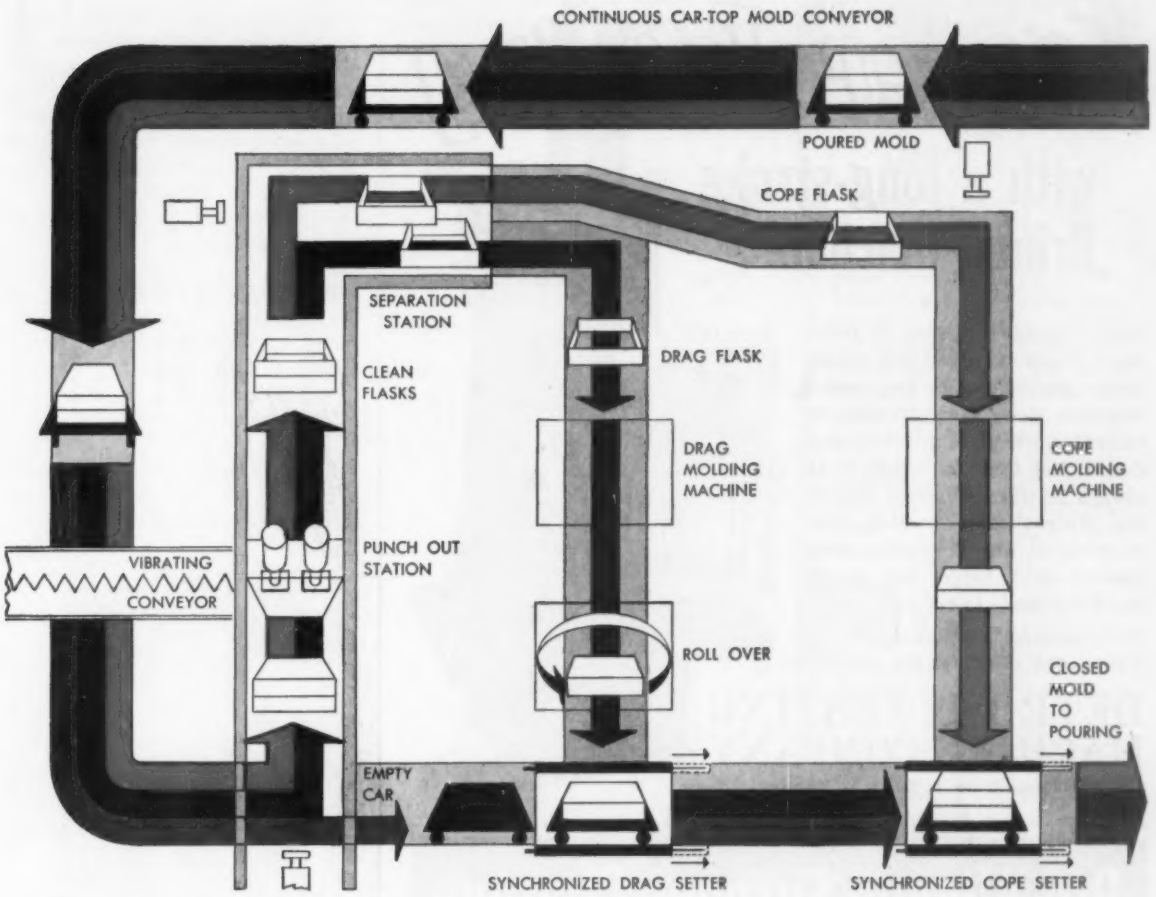
Ernest A. Hund has been appointed manufacturers' agent in southern Indiana, southern Ohio, and northern Kentucky for the following: Modern Equipment Co., Port Washington, Wis.; Newaygo

ERNEST A. HUND
. . . foundry equipment sales

Engineering Co., Newaygo, Mich.; States Engineering Corp., Ft. Wayne, Ind.; Ohio Electric Mfg. Co., Cleveland; Homer Mfg. Div., Lima, Ohio; Centrifugal Casting Machine Co., Tulsa, Okla.; and United Oil Mfg. Co., Erie, Pa. He will also represent Campbell-Hausfeld Co., Harrison, Ohio, Van Gorp Mfg. Inc., Pella, Iowa, and Fremont Flask Co., Fremont, Ohio, on a non-exclusive basis.

John E. Benedict, formerly with Worthington Corp., Buffalo, has been named sales representative in western New York, northwestern Pennsylvania, and southern Ontario, for Queen City Sand & Supply Co., Buffalo.

Elton E. Staples has been named vice president in charge of operations, industrial and laboratory heating equipment, Hevi-Duty Electric Co., Div. of Basic Products



NEW AUTOMATIC MOLD HANDLING SYSTEM

...ANOTHER EXAMPLE OF PLANET VERSATILITY

This new Planet automatic mold handling system, installed in a large automotive foundry, is another example of how *Planet Versatility* saves time and money, and increases efficiency and production. The system automatically guides 300 molds per hour through a complete casting cycle . . . *and it will pay for itself in less than one year.*

HERE'S HOW IT WORKS:

After molding, the drag flask (center of diagram) is rolled over 180 degrees and with split-second timing is positioned on a continuously moving car-top mold conveyor. Next, it is conveyed to where the completed cope, without stopping the line, is gently and accurately placed on the drag. The closed mold is then poured, the only manual operation on the line.

The poured mold continues on the car-top mold conveyor to where it is pushed onto the punch out station. Here the castings and sand are dropped onto a double-decked vibrating conveyor for disposition. The clean flasks then move to the separation station, are separated, and returned to their respective molding machines to be refilled and recirculated through the system.

Powered rollers throughout the system hold flask wear and damage to a minimum . . . there is no sliding contact on this Planet engineered system.

Custom designed systems, such as this automatic mold handling system, have helped build Planet Corporation's reputation as a *versatile* organization with solutions to perplexing production, materials handling and automation problems. Let Planet demonstrate how its "PV" engineering skill can help you . . . you'll find that *it pays to plan with Planet.*

PLANET CORPORATION

• Engineered Handling Systems
• Automation Equipment
• Mill & Foundry Handling Equipment

1818 SUNSET AVENUE
LANSING, MICHIGAN

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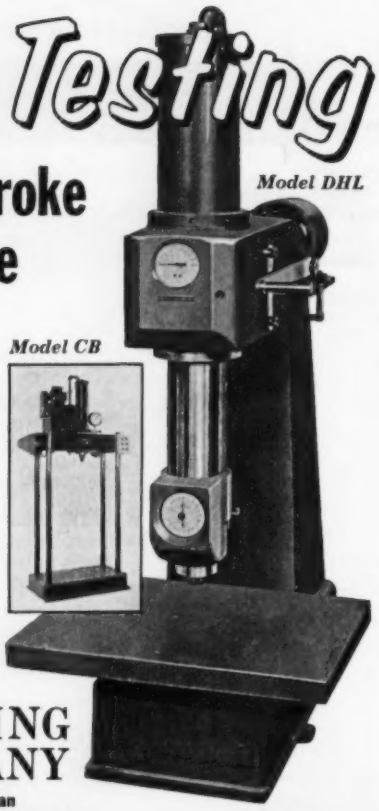
Faster Testing

with a long-stroke Brinell machine

Model DHL



Model CB

Faster hardness testing is yours when you use a Detroit long-stroke testing machine. The long-stroke test ram does the adjusting to various work piece heights, and does it fast. Constant height table always matches conveyor height, too. Hydraulically operated, with or without direct reading dial (shown with). Larger and special machines made to order.

Write today for information about our Brinell and other testing machines

DETROIT TESTING MACHINE COMPANY

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Pre-Alloyed Furnace Charges

at a cost less than the price of their original components!

Quality Controlled Stainless and Nickel-Cobalt Alloys in Briquettes, Cut Plates, Stampings and other forms

● These Pre-Alloyed Furnace Charges from Security Alloys, pioneer processors of alloyed nickel, will help reduce your melting time because of their high density and uniform analysis. Tailor-made to most commercial and military specifications, requiring fewer foundry additives and permitting easier prediction of casting analysis.

Color-coded and packaged to your requirements at no extra cost.

For more information on how our Pre-Alloyed Furnace Charges can save you time and money, *write to Foundry Division, Security Alloys Company, Incorporated, 3106 West 49th Place, Chicago 32, Illinois or phone PRospect 6-8500.*

SEND FOR FREE POCKET-SIZE ALLOY SLIDE CHART
Complete analysis of over 100 nickel-cobalt alloys

FOUNDRY DIVISION

SECURITY ALLOYS CO. INC

Circle 676 on Page 53

Corp., Milwaukee. **Arthur Frank,** formerly vice president-furnace engineering, has been made vice president-sales, and **Elmer Brandt,** vice president-manufacturing. **John Steinman** has succeeded Mr. Brandt as manager of the Watertown, Wis., plant. **Albert Bassett** has become chief engineer of the industrial furnace division.

Lee Neff, formerly of Neff & Fry Co., Camden, Ohio, has joined the industrial silo sales staff, Marietta Concrete Div., American-Marietta Co., Marietta, Ohio, in charge of Midwest sales.

Steve Kulchar, formerly with West Steel Castings Co., Cleveland, recently joined Atlantic Foundry

STEVE KULCHAR
. . . joins Atlantic Foundry

Co., Akron, Ohio, as sales engineer. He is a director of the Canton Chapter of the American Foundrymen's Society.

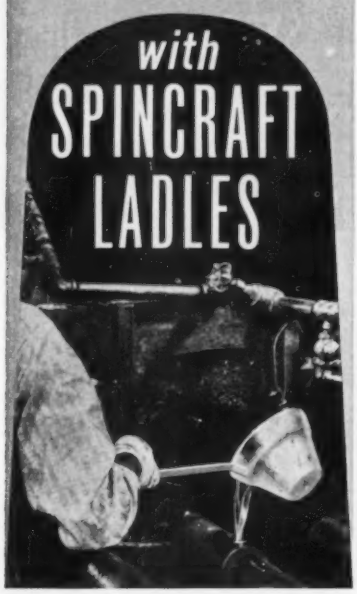
Richard A. Flinn, professor of metallurgical engineering, University of Michigan, has been granted sabbatical leave for the 1960-61 second semester to revise two texts, *The Development, Selection and Control of Metallic Materials,* and *The Fundamentals of Metal Casting*

Albert J. Reichers has been appointed general plant manager, Cooper Alloy Corp., Hillside, N. J. He has been plant manager of the company's Stainless Engineering Div.

C. J. Schmidt, since 1956 executive vice president, J. O. Ross Engineering Div., has been named a vice president of Midland-Ross

POUR EASIER, POUR FASTER, MORE POURS PER LADLE

with SPINCRAFT LADLES



Light, rugged, Spincraft ladles save replacement costs, make every pouring job easier! Available in a vast range of sizes, in stainless steel as well as mild.

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LIGHT IN WEIGHT
LESS FATIGUE!

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NON-SPILL SHAPE
NO WASTE!

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EQUIPOISED HANDLE
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SKILL WILL DO IT

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Circle 677 on Page 53

Corp., New York, the parent company. He joined the Ross organization in 1930, became Detroit office manager in 1933, a vice president in 1947, and vice president and sales manager in 1954.

Charles R. Spencer, since 1957 manager of distributor sales, Gates Rubber Co., Denver, has been named field sales manager. With the company since 1951, he previously served in sales research and market extension.

Robert D. Clark has been named president, Northern Malleable Iron Co., St. Paul, succeeding **George T. Boli,** who has become board chairman. **Donald B. Fulton,** vice president-manufacturing, has been appointed vice president-general manager. Mr. Fulton and **Thomas Kirby,** sales vice president, were made directors.

ROBERT D. CLARK
. . . Northern Malleable pres.

George A. Park retired recently as sales manager of abrasives, Norton Co., Worcester, Mass., after 50 years with the company. Previously he was Cleveland district manager, assistant sales manager, regional sales manager, and manager of distributor sales.

Robert C. Harris has joined the research staff, Beryllium Corp., Reading, Pa., as supervisory metallurgist. He was with Arwood Precision Casting Corp., Tilton, N. H., in research and development.

Gordon O. Watson has been named assistant director of marketing, Carborundum Co., Niagara Falls, N. Y. **D. H. Currie** and **A. E.**

More than one road may be open, in the search for better utilization of facilities and realistic cost control. For example, there are improvement of methods, reorganization of plant or department layout, simplification of paper work . . . *to name only a few.* WESTOVER experience can point out the best way for your company to travel . . . and help you over the rough spots.

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NAME

TITLE

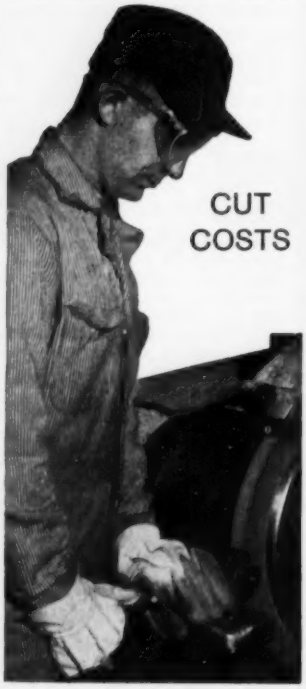
COMPANY

STREET

CITY/STATE

DRESS SNAGGING WHEELS:

CUT COSTS



Coarse snagging wheels grind faster, last far longer when dressed regularly with a Desmond Heavy Duty dresser. Even on high-speed resinoid and rubber bonded wheels inexpensive Desmond mechanical dressers expose new, sharp grains and provide a fresh, unloaded surface. Desmond Hex and Huntington dressers are widely used on large and medium size vitrified and silicate wheels. Desmond dressers soon pay for themselves.

The only complete line of grinding wheel dressers and cutters

Desmond

Desmond-Stephan Mfg. Co.

Urbana, Ohio

Circle 679 on Page 53

Bennett have been appointed district field sales engineers in Buffalo and Detroit, respectively. **P. R. Thomas** has been made product manager for vitrified products, metallic applications.

Howard Strandberg, formerly executive vice president-operations, Seaboard Refractories Co., Fords, N. J., has joined Refractories Div., H. K. Porter Co., Pittsburgh, as New York district sales manager.

W. Turney Shute has joined Lester B. Knight & Associates, Chicago, and is with Knight Engineering Establishment in Zurich, Switzerland. He was formerly technical director, West Michigan Steel Foundry Co., Muskegon, Mich., and works manager, Canadian Steel Foundries Ltd., Montreal, Que.

W. TURNEY SHUTE
. . . joins Lester B. Knight

Henry G. Magnussen has been named advisor to the director of the Metal Working Equipment Div., Business and Defense Services Administration, Washington. Mr. Magnussen, for many years an official of Lindberg Engineering Co., Chicago, is now a director of the company. He recently resigned as vice president and director, Lindberg Steel Treating Co., Chicago.

Robert J. Saggau, formerly with Lauson Engine Div., Tecumseh Products Co., New Holstein, Wis., has been appointed product sales manager, Spincraft Inc., Milwaukee.

W. R. Heflin, secretary-treasurer, director, and former general manager, Iowa Malleable Iron Co., Fairfield, Iowa, has retired after 40

BULK STORAGE COSTS GO DOWN WHEN A *Marietta* CONCRETE SILO SYSTEM GOES UP

Whether your requirement is for one or many silos you can't beat the complete flexibility of a Marietta Concrete Silo System for bulk storage. It adds efficiency and cuts storage losses because each system is tailored to fit your exact requirements. And, each unit is designed for complete integration with whatever mechanical or pneumatic handling system required for the material stored.

When you consider bulk storage problems be sure to consult Marietta engineers for qualified recommendations on the concrete silo system that is best suited to your particular needs. They will work closely with your consultants and contractors to assure you the most efficient and flexible bulk storage system possible.

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AMERICAN-MARIETTA COMPANY
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Representatives in principal cities

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Circle 680 on Page 53

years of service. **J. B. Calhoun** has been appointed treasurer, and **Thomas A. Louden**, secretary.

H. A. Bednarski has been named assistant manager, basic sales, hearth materials, and **K. E. Hansen**, assistant manager, basic sales, Harbinson-Walker Refractories Co., Pittsburgh. They will continue to work out of the home office there.

J. G. Holmes, assistant manager of the Pittsburgh area, has been appointed manager of the new central

J. G. HOLMES
. . . becomes regional mgr.

sales region of Union Carbide Metals Co., division of Union Carbide Corp., New York, with headquarters in Cleveland.

Henry B. Puff has been named manager of field sales, Durez Plastics Div., Hooker Chemical Corp., North Tonawanda, N. Y. **Richard W. More**, sales engineer, has succeeded Mr. Puff as assistant product manager of resins for the division.

Wayne J. Mitchell has been named district manager in Portland, Oreg., for Link-Belt Co., Chicago, succeeding **Lester T. Graham**, who has retired. Mr. Mitchell joined the company in 1948. Mr. Graham was with Messe-Gottfried Co., Seattle, when it was acquired by Link-Belt in 1923.

Paul H. Magnus II, vice president, Rosedale Foundry & Machine Co., Pittsburgh, has been elected executive vice president. He joined the company in 1948 as an engineer. **Donald H. Ambrose**, foundry superintendent, has been elected a

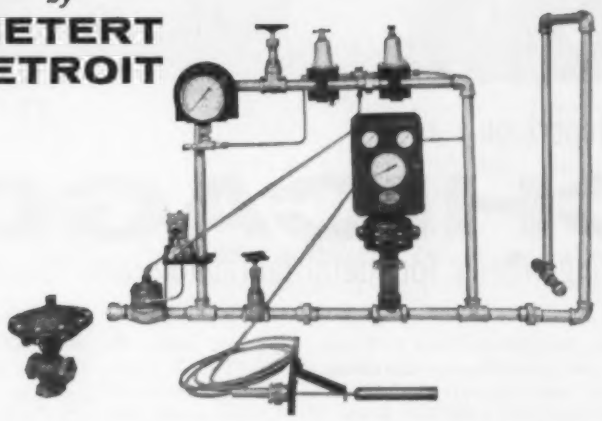
HOT SAND PROBLEM ELIMINATED INEXPENSIVELY

. . . with the installation of a

No. 3903 AUTOMATIC SAND COOLER

by

DIETERT DETROIT



1. Automatically adds water proportionate to the temperature of the sand, thereby rapidly decreasing sand temperature while enroute from shake-out to sand storage bin.

2. Improves mulling efficiency because cooler sand is assured for mixer.

3. Improves sand properties due to reduction in drying out of shake-out sand.

4. Minimizes the amount of moisture evaporated from prepared molding sand.

5. Improves casting finish and decreases scrap losses caused by hot sand sticking to patterns.

6. Low original investment. Requires little, if any, maintenance. Completely automatic; no direct labor expense. Can be easily installed by customer.

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Gentlemen: Rush me data on the No. 3903 Dietert-Detroit Automatic Sand Cooler.

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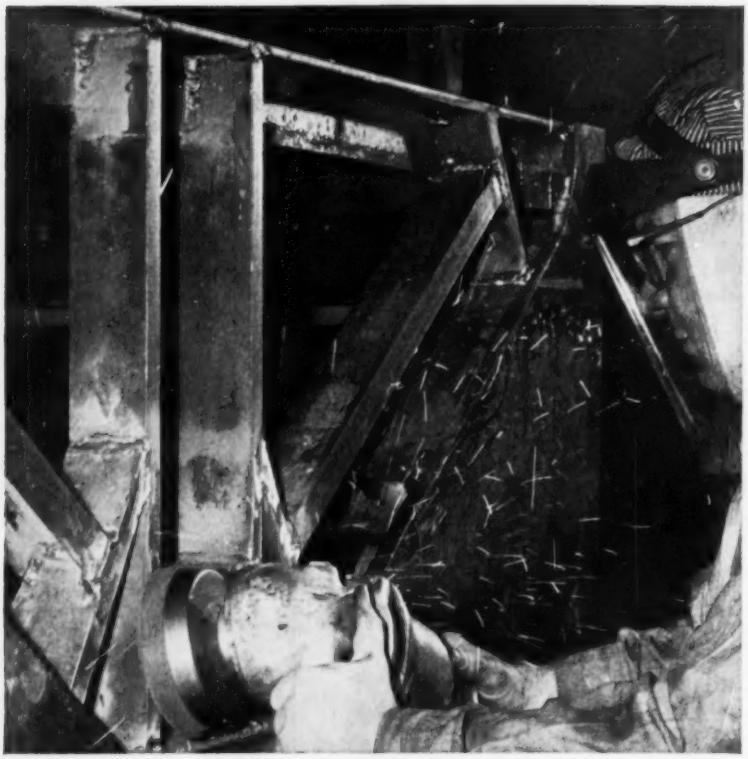

A Report on

CHICAGO

grinding wheels for metal fabricators and foundries

Today, the Chicago Type 11 Taper Cup, pictured above, is the safest, fastest, most economical wheel for metal fabricators and foundries.

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We would like to hear from you regarding your particular application. There is a Chicago Wheel sales representative in every major industrial area, ready to serve you.

Write for Chicago Wheel Bulletin F-80
Special catalog for metal fabricators and foundries illustrates grinding wheels, gives you prices and quantity schedules. Write for your free copy today.

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& MFG. CO., 1101 W. Monroe Street
CHICAGO 7, ILLINOIS

deburring small parts

smoothing large castings

chamfering structural steel

weld grinding

vice president. Mr. Ambrose has been with Rosedale since 1947.

J. W. Drydyk has been appointed vice president in charge of plant operations, and **W. A. Eckhart,** vice president in charge of sales, Meta-Mold Aluminum Co., Cedarburg, Wis., subsidiary of Dayton Malleable Iron Co., Dayton, Ohio.

H. J. Shaner, formerly Chicago district manager, has been made division manager, Ramtite Co., refractory manufacturing division of S. Obermayer Co., Chicago. **K. J. Kettner** has been named sales manager. He was formerly regional manager for northern Ohio and Michigan.

H. J. SHANER
. . . Ramtite div. mgr.

John A. Wagner, president, Wagner Castings Co., Decatur, Ill., has been elected chairman of the trustees of the Malleable Research and Development Foundation, succeeding **Anthony F. Haswell,** president, Dayton Malleable Iron Co., Dayton, Ohio.

James W. Ferguson, manager of field sales, has been named sales manager, Durez Plastics Div., Hooker Chemical Corp., Niagara Falls, N. Y., succeeding the late Alfred W. Hanmer.

Orlan A. Johnson, president, Gifford-Wood Co., Hudson, N. Y., has been elected president of the Conveyor Equipment Manufacturers Association, succeeding **J. B. Nordholt Jr.,** president, Webster Mfg. Inc., Tiffin, Ohio.

Harry L. Burnham, formerly with Phillips Mfg. Co., Chicago, has joined Ransohoff Co., Hamilton,

CORE HARDENING TIME CUT

from 3 hours to 15 seconds*

...WITH PURECO CO_2 "FLASH CURING"

The Pureco CO_2 *Flash Curing* process can mean extensive savings in time and money to you. Hardening time is cut from hours to seconds . . . no costly baking ovens or core driers are needed . . . valuable space is saved . . . more accurate castings with smoother finish result. Mold drying is eliminated . . . rapid production of finished cores expedite rush orders. In-plant handling time is drastically reduced.

For production or custom work.

Pureco can tailor a *Flash Curing* installation to meet your specific foundry requirements —large or small. Cost is low—installation simple.

Have a trial Flash Curing demonstration.

Pureco would like to demonstrate its *Flash Curing* process in *your foundry* under *your working conditions*, with no obligation on your part. Call your local Pureco man or write:

**Actual Pureco test*

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Nation-Wide Pureco CO_2 Service-Distributing Stations in Principal Cities
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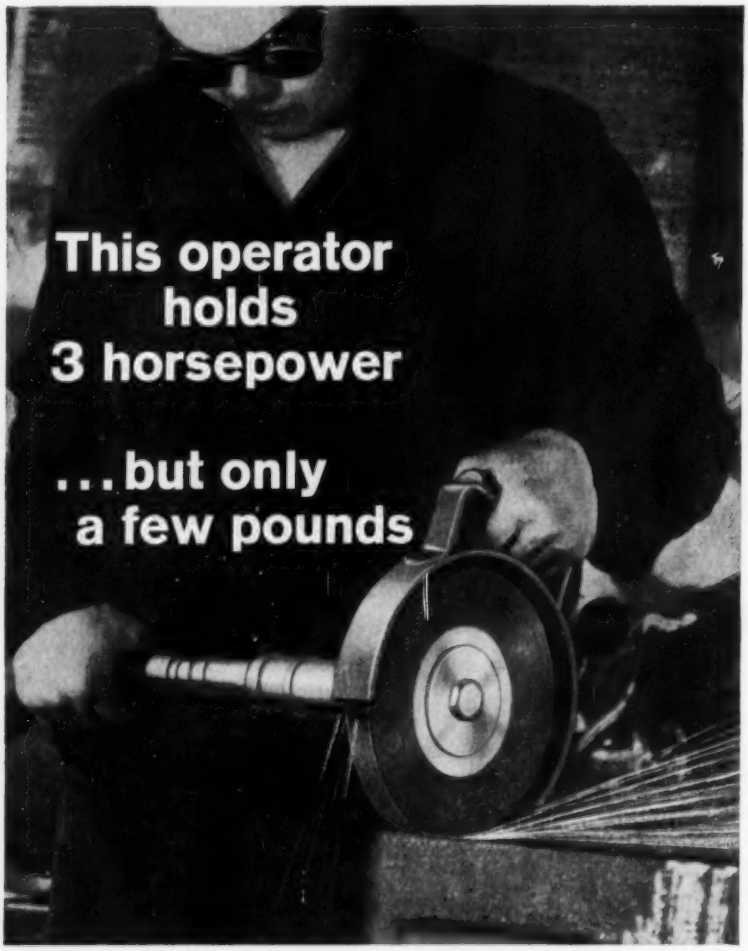

Remington flexible shaft machines give an operator the flexibility of a hand tool plus the power for heavy-duty finishing operations in a convenient unit that weighs just a few pounds. Remington machines are ¾, 1½, or 3 hp and they're available in dust- and vaporproof or ventilated, industrial-duty motors.

Power is transmitted to the work by heavy-duty, Remington-made flexible shafts of high-carbon steel wound solid to the center. Shaft housing has exclusive, shiplap wound metal liner protected by steel armor and a tough grease-proof vinyl cover.

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Remington Arms Company, Inc., Bridgeport 2, Connecticut

Please send free information on Remington Flexible Shaft Machines and Remington Contractor & Industrial Equipment I have checked below:

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*Name*_____ *Position*_____

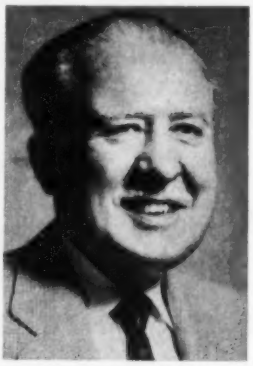
*Company*_____

*Address*_____

*City*_____ *Zone*_____ *State*_____

Ohio, as sales engineer in northern Missouri, central Illinois, and northern Indiana.

Carl F. Beers, president, Carl Beers Co., Birmingham, Mich., has been appointed to handle sale of



CARL F. BEERS
. . . Lanly Co. equipment sales

heat processing equipment in the Michigan area for the Lanly Co., Cleveland.

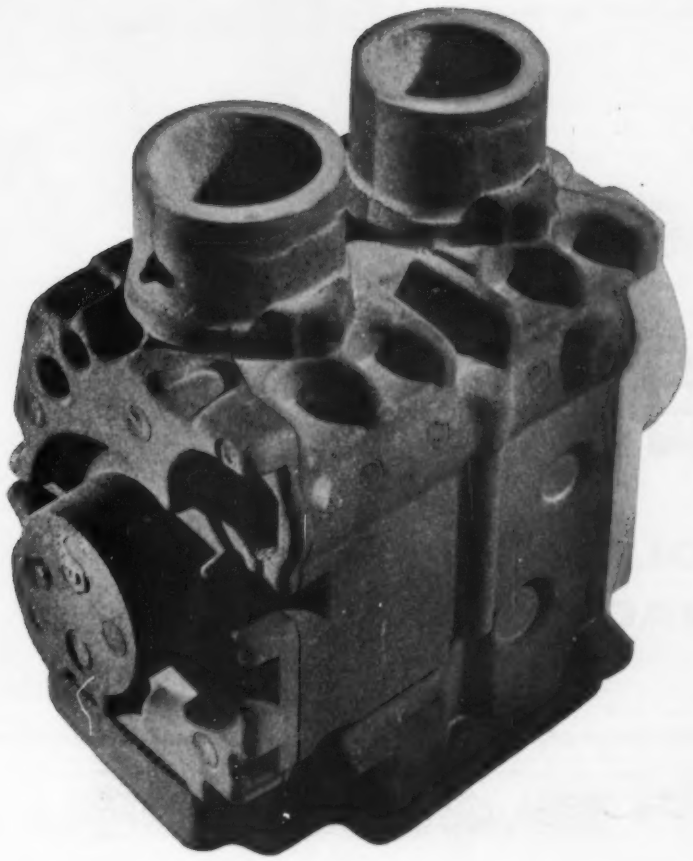
Robert A. Green, abrasive specialist, Bay State Abrasive Products Co., Westboro, Mass., has been ap-

ROBERT A. GREEN
. . . Bay State district mgr.

pointed Detroit district manager, succeeding **S. Gordon Saunders,** who has been made a sales consultant.

William J. Grede, since 1956 head of the executive committee, has been elected president of J. I. Case Co., Racine, Wis., succeeding **Marc B. Rojtman,** who becomes special adviser to the president.

Harold T. Hansen has rejoined the Chicago sales office, Mathews Conveyer Co., Ellwood City, Pa., after a short leave of absence.



"We tried 'em all,"

says Milwaukee's Mid City Foundry,

"and Durez is 5 ways better"

That's not the first blush of enthusiasm talking.

Here's a foundry that's been using shell cores for more than a year. Twenty per cent of their production is from shell cores, and soon *all* will be shell.

Says Les Van Laanen, Superintendent at Mid City: "Durez gives us a more uniform mix. It cures faster. The mix doesn't lump. Shells are more uniform in weight after cure. Moreover, there are only two ingredients to worry about."

Typical of the shell cores produced at Mid City is this 2-barrel crankcase core. There was a saving on materials over the old method of core blowing. Also, cleaning cost less, surfaces were better and tolerances were right on the button.

Foundrymen everywhere get results like this with Durez foundry resins.

Among the reasons: uniformity from shipment to shipment; practical shop help from Durez technical men who learned their business right in the foundry.

Your Durez representative can show you how to put Durez resins to profitable use in your foundry. Why not call him. Soon.

DUREZ PLASTICS DIVISION

HOOKER CHEMICAL CORPORATION, 1003 WALCK RD., NORTH TONAWANDA, N. Y.

HOOKER CHEMICALS PLASTICS

Circle 685 on Page 53

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REFRACTORY PRODUCTS

CUPOLA REFRACTORIES

Photograph courtesy of Whiting Corporation

DESIGNED

..to meet your specific requirements for maximum service

A. P. Green has a complete line of high quality refractories for every zone of cupola service. For top efficiency and economy tailored to your particular cupola requirements — A. P. Green manufactures cupola blocks, firebrick, fire clay, high temperature bonding mortars, plastic refractories (super duty, high alumina and graphite-type), breast brick, slag-hole blocks, high strength castable refractories, and special siliceous mixes for gun application or for ramming.

When your A. P. Green representative recommends a particular type of lining, you're sure of the finest refractories modern research can develop . . . specifically designed to give you maximum service at lowest cost.

For specific recommendations, contact your local A. P. Green distributor . . . he's listed in the yellow pages of your telephone directory . . . or write

50
FIFTY YEARS OF PROGRESS

A. P. GREEN FIRE BRICK COMPANY

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Use of riser sleeves has permitted reductions in size of risers and thus increased casting yield

RISER SLEEVES

Aid Feeding of Castings

By W. L. FISMER
Vice President, Production
T. Shriver & Co., Harrison, N. J.

● IN TODAY'S competitive markets, our foundry must seek constantly to make our products better and to reduce production costs and time.

This search means that we always are interested in appraising new or improved products or methods which might improve or speed production, increase yield, reduce rejects, and produce sounder castings. One such product, a new riser sleeve, has been in successful use in our aluminum casting operations for about 18 months. Consumption has averaged 2000 to 3000 monthly.

Developed by Johns-Manville and called Ris - A - Sleeve, these sleeves are formulated from expanded silica and a binder. Properties include about 0.04 thermal diffusivity, 40 psi minimum transverse strength, and 0.011 in. per 8-in. length linear shrinkage, moist to dry. Density is 9 lb per cubic foot, and our employees have found them easy to cut and shape. We have tested and used these sleeves in all of their five inside diameters, which range from 1 5/16 to 4½ in. Available lengths are 4 to 8 in.

Made for aluminum, brass, and bronze casting, the sleeves reduce heat transfer so that solidification of the riser is delayed and more time is available to feed small, remote areas. Riser metal stays molten for minutes longer—in our experience, with aluminum, twice as long as previously. We also have found that the sleeves will not contaminate sand and do not tend to pick up moisture from the air.

For castings which solidify slowly, it normally is sound practice for risers to contain much more molten metal than actually is required for feeding. This additional metal provides the heat necessary to assure directional solidification and to keep the riser metal molten for the required length of time. By

Closeup of riser sleeve in mold. The sleeves are formulated from expanded silica plus a binder

View shows rows of riser sleeves embedded in foundry molds. They are used to promote metal feeding

Profits from Wastes

The SuperDuty® table makes it possible for you to recover valuable metallic particles from foundry residues and machine shop wastes . . . efficiently and profitably.

The SuperDuty table, by processing materials across a riffled deck, spreads out the bed for accurate recovery of metallics having even slight differences in specific gravity.

You may be able to save many thousands of dollars this economical way. Send for Bulletin 118-C.

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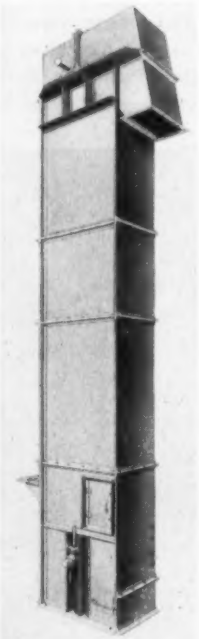
Webster **BUCKET ELEVATORS**

for *handling* FOUNDRY SAND

WEBSTER Bucket Elevators can be supplied in practically any capacity. Made in centrifugal, perfect or gravity discharge, continuous bucket, and super capacity types. Buckets can be furnished malleable iron, duramal or steel.

WEBSTER Conveyors for sand, shot, molds, castings, refuse, etc. are widely specified by foundry engineering consultants and used by specialty equipment manufacturers in foundry mechanization programs. All components of WEBSTER equipment are manufactured and assembled in the Webster plant in Tiffin, Ohio.

Write for Catalog BE-55



Webster **MANUFACTURING, INC.**

DEPT. F-30 TIFFIN, OHIO

BULK MATERIALS HANDLING EQUIPMENT

SINCE WM 1876

Offices in all Principal Cities

Circle 688 on Page 53

increasing heat retention, sleeves have allowed us to reduce riser size, thus increasing casting yield.

Insulating sleeves give excellent results in such applications as feeding castings that require a restriction in the diameter of the riser due to cope bars or contact area available on the casting for an adequate riser. They also have helped in the production of pressure castings which formerly had given trouble. We have shipped castings which were noticeably heavier because of better feeding.

The theory and techniques involved in the use of these sleeves are based on the principles of directional solidification. Unless solidification can be retarded at the junction of casting and riser, greater riser life or fluidity is of no great value. This product, we have found, retards solidification of the whole riser, including the neck, and assists in establishing controlled directional solidification in the casting.

Chicago Chapter Sponsors Sessions on Supervision

"Supervision—Key to Foundry Progress" is the theme of the 1960 Educational series which the Chicago Chapter of AFS will conduct in March.

The chapter's regular meeting at the Chicago Bar Association, March 7, will kick off the three-session series, with Edward McFaul, Chicago lecturer and humorist, speaking on "How To Keep Your Foot Out of Your Mouth."

The March 14 and 21 sessions will be in the Peoples Gas Light & Coke Co. auditorium. On March 14, A. J. Bohl, chief engineer, Wolf Management Engineering Co., Chicago, will speak on "How Effective Is Your Supervision?," and I. G. Robinson, manager of industrial engineering division, Lester B. Knight & Associates Inc., Chicago, will discuss "Every Foreman Is a Foundry Manager."

Speakers for the March 21 session are C. L. Schwyhart, manager of the education training department, Caterpillar Tractor Co., Peoria, Ill., on "We Adults," and J. H. Hazlehurst, senior staff member, Stevens, Thurow & Associates Inc., Chicago, on "How To Build Productive Manpower."

Report card on:

Cedar Heights Bonding Clay

Raw Materials	*From the world's finest clay deposits*
Mining	*Most modern methods employed*
Screening	*Super-refined; produced in 6 meshes*
Grinding	*Laboratory controlled throughout*
Packaging	*Strong, weather-proof. Stands hard handling*
Delivery	*Delivery dates are promises; they're kept*
Price	*In line . . . . and attractive*
Behavior	*Helps produce better castings*
Remarks	*Have you sent for your free sample yet?*

Ask for the address of the Cedar Heights distributor nearest you.

CEDAR HEIGHTS CLAY 50 PORTSMOUTH ROAD OAK HILL, OHIO **COMPANY**

Circle 689 on Page 53

the new Branson SONORAY® Model 5

pulse-echo Flaw Detector is truly PORTABLE!

WEIGHS ONLY 37 LBS!

Take it anywhere for CONTACT or IMMERSED TESTING

Any frequency from 0.4 to 10.0 mc/s without tuning, by a simple change of transducers — with the most nearly perfect acoustical "picture" of internal structure obtainable today. And, as with all Branson products, service nationwide is assured at all times. For full information about the all-new SONORAY® Model 5, send the coupon today to Branson Instruments, Inc.

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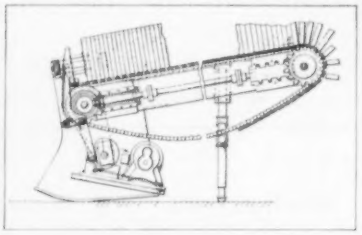
Circle 690 on Page 53

PATENTS

Of Interest to Foundrymen

Eliminates Mold Clamping

Mechanized mold pouring device shown in accompanying sketch is claimed to eliminate external clamping or confining molds. It employs an inclined slat conveyor moving between vertical side plates. Dry sand molds with cavities in opposing faces as well as channels or troughs on the top sides are used. When a new mold is set on lower



end of the conveyor, it trips a switch which causes forward movement of a cam-operated platen against which the mold rests. This pushes the mold into position against the preceding one where it is held by movable latches. As each new mold moves into position, all molds ahead of it move one mold width forward. *Patent No.* 2,910,745 *granted to C. E. Norton and assigned to National Malleable & Steel Castings Co.*

Hollow Core Forming

Method and apparatus is described for forming hollow cores in silicate-bonded sand. It includes a mounting base, from which a hollow rubber member or tube projects, and means for entry of CO_2 gas for inflation of the tube. This rubber member is perforated with several fine holes which permit escape of CO_2 only at 50 to 150 psi, when it is fully inflated.

In use, a flask or box is placed over the projecting member, filled with silicate bonded sand, and CO_2 is admitted to inflate the rubber member. That not only compresses the sand but also hardens it through escape of some CO_2. On release of the gas pressure, the rubber tube

CLEVELAND BIN VIBRATORS MOVE MATERIALS

It takes valuable man hours to loosen up clogged bins with a sledge hammer. Even if your bins clog up only once a day, the wasted man hours will pay for a Cleveland Bin Vibrator in less than a year's time.

Cleveland Vibrators will keep your bins open without damage. They're low in initial cost, and maintenance is virtually nil. Installation is rapid and simple. Complete engineering help for selection and installation is furnished without extra cost.

AIR

ELECTRIC

Both air and electrically operated Cleveland Vibrators are available for immediate delivery from our San Francisco warehouse. Write today for complete details, including prices.

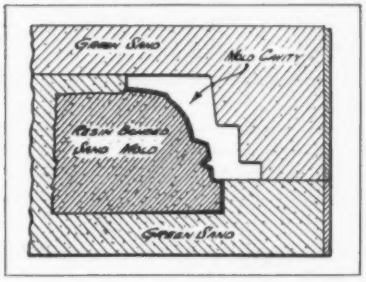
Dept. 3H, 2788 Clinton Ave., Cleveland 13, O.

Circle 691 on Page 53

returns to its original shape, permitting the core and container to be lifted off. *Patent No.* 2,903,762 *granted to Donald C. Caudron.*

Method of Making Molds

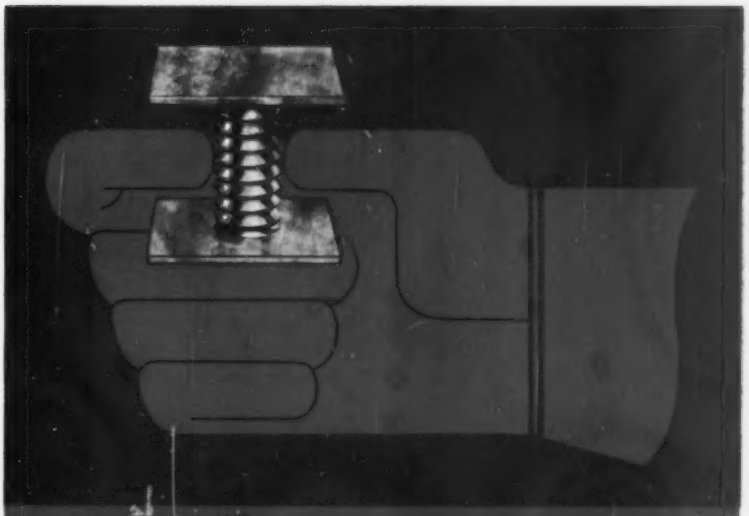
Mold producing method provides a high degree of accuracy, high strength, and rigidity in a mold for producing castings of close dimensional tolerances and smooth surfaces. The process includes making an accurate negative impression mold of resilient plastic or synthetic rubber from the original pattern, and from that mold any desired number of disposable positive molds of a plaster composition are



made. The positive molds, still in the damp state, are coated with a thin layer of fine-grain resin-coated sand by rolling or shaking the mold, and pouring out the excess. The coating is backed up by filling the molds with coarse resin-coated sand. Molds containing the sand are placed in an oven and baked at 425° F for 3 to 13 hours. The plaster molds are broken away from the sand shapes, which are assembled together to form the mold face coming in contact with the molten metal. *Patent No.* 2,914,823 *granted to X. L. Bean and assigned to Morris Bean & Co.*

Automatic Mold Production

Blow and squeeze molding machine is arranged so that after the sand compact is blown, the table containing the compact is drawn down sufficiently to permit the blowing head and sand hopper to be moved horizontally out of the way. Then as a flask is moved in position over the sand compact, the table rises to squeeze the sand compact into the flask. Table containing the pattern moves down, leaving the sand compact compressed into the flask, which then is moved



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CHAPLET
or CHILL
for every
CASTING JOB
to insure better castings
to reduce scrap losses
to reduce labor costs

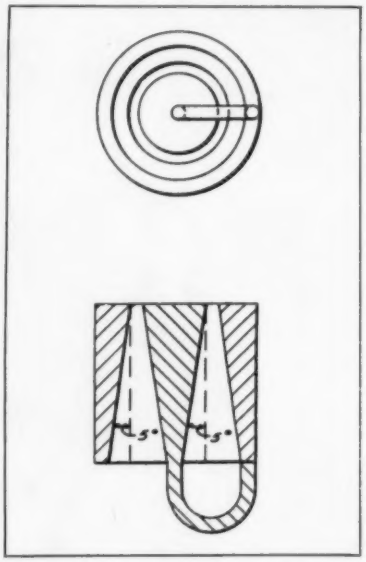
Milwaukee Chaplet & Mfg. Co.
1025 SOUTH 40th STREET • MILWAUKEE 46, WISCONSIN

Circle 692 on Page 53

aside. Various movements are made automatically by suitable control equipment. *Patent No.* 2,908,950 *granted to L. F. Miller and E. K. Hatch and assigned to Osborn Mfg. Co.*

Device Vents Corebox

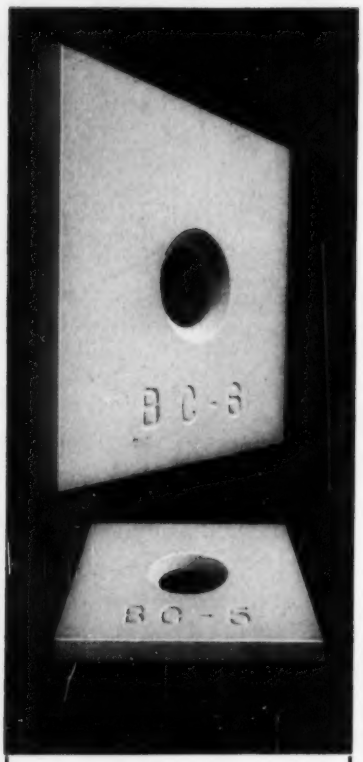
Corebox vent, intended particularly for shell molding and shown in the accompanying illustration, is claimed to be simple and rugged in construction, economical to manufacture, and efficient in operation.



It consists of a cylindrical body with outwardly tapering aperture with a preferred angle of divergence of 5°. Axially disposed within the hole with a peripheral clearance of 0.005 in. is a truncated pin with the same angle of divergence. Pin is attached to the body by a semicircular arm which functions as a spring, and when the sand mixture is blown into the corebox the pin vibrates. This action permits venting the air but prevents escape of the sand as well as clogging or plugging. *Patent No.* 2,914,821 *granted to Otto P. Yahnka.*

Die for Pressure Casting

Patent describes a metal die structure for producing a valve plate for a gas meter with internal passage interconnecting the exhaust port with the slide valve controlled port. It includes three cores for the exhaust port, slide valve controlled port, and for passage be-



Louthan breaker cores cut foundry costs

You minimize casting problems, get cleaner castings when you use Louthan *refractory* breaker cores. They facilitate rapid removal of the riser, with subsequent labor savings. There is no core gas. Available for all riser diameters from 2″ to 12″, and for use with *any metal casting* risering from a flat surface.

Write for Free Gating and Risering Refractory Folder. Complete file of specifications on all Louthan products.

LOUTHAN
MANUFACTURING COMPANY
A DIVISION OF FERRO CORPORATION
EAST LIVERPOOL, OHIO

Circle 693 on Page 53

Cut Your Costs And Save Your Patterns With Arrow Butts And Peins . . . featuring replaceable rubber tips.

Over one half million have been used with complete satisfaction. Send for catalog on complete line of butts and peins. We feature 13 types. Sand rammer butts are our business, not our sideline.

Arrow BUTT COMPANY
4800 W. 139th St., Cleveland 35, Ohio

Circle 694 on Page 53

Water Works
HARDER-FASTER
when conditioned with the
AQUADYNE SYSTEM

The water you use in (1) sand conditioning, (2) core and mold washes, (3) cupola linings, and (4) CO_2 core cleaning has greater penetration and dispersion when conditioned in the simple AQUADYNE way, thus...

- *Reduces the amount of water needed*
- *Reduces sand temperature*
- *Makes sand feel wetter than it really is*
- *Wets sand, clay, dust, etc., faster*

Write for literature
Dealer inquiries invited

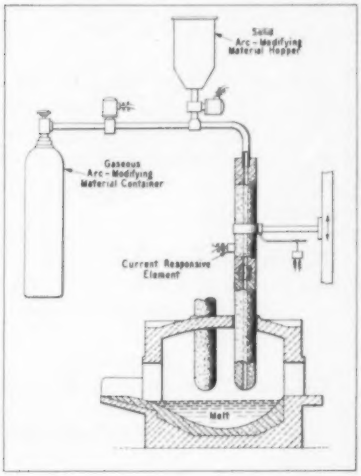
AQUADYNE CORPORATION
89 TERMINAL AVENUE
CLARK, N. J. • FUlton 1-3036

Circle 695 on Page 53

tween these ports. The last is attached to one of the first two core members and is arranged so that it can be removed from the casting through one of the ports. *Patent No. 2,905,990 granted to Harry O. Whipple and assigned to Rockwell Mfg. Co.*

Controls Electric Arc

Use of a hollow carbonaceous electrode for electric arc furnaces is said to control and stabilize the arc, thereby improving furnace productivity and quality of metal. Arc length may be enhanced by injecting argon through the bore, or



argon or nitrogen carrying calcium fluoride or sand and limestone. Arc length may be shortened by entraining in the inert carrier gas a solid such as boric acid or gaseous material such as steam, ammonia, or manufactured gas. *Patent No. 2,909,422 granted to W. E. Schwabe and assigned to Union Carbide Corp.*

Measures High Temperature

Thermocouple for measuring high temperatures can be immersed in a molten iron or steel bath without ceramic protecting tubes, and is not destroyed by the liquid slag covering the bath. It is composed of two elements. One is formed of chromic oxide, and the other is a mixture of chromic oxide with at least one oxide selected from the class consisting of ferric oxide, zirconium oxide, and titanium oxide. *Patent No. 2,912,477 granted to W. A. Fischer and assigned to Max Planck-Institut fuer Eisenforschung.*

STEP UP YOUR PRODUCTION OF SHELL CORES AND MOLDS WITH . . .

FASKURE

RESIN COATED SAND

THE FASTEST CURING SAND AVAILABLE

REDUCE YOUR COSTS
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• CUT REJECTS
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FASKURE is a tested, proven product — a combination of our exclusive formulae and processing, backed by years of experience in our own and many other foundries.

QUALITY CONTROL — positive uniformity assured by testing all sand to meet specifications for melt point, tensile strength and rate of shell formation.

FOR MOST FOUNDRIES . . . FASKURE IS LESS EXPENSIVE THAN "MIXING YOUR OWN"— eliminates scrapped cores and castings caused by experimental coating. Saves on equipment costs, floor space and labor.

STANDARD MIXES AVAILABLE FROM WAREHOUSE STOCK — specials on request.

Ask for demonstration

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FASKURE COATED SAND DIVISION
AURORA METAL COMPANY
614 WEST PARK AVENUE • AURORA, ILLINOIS
PHONE TWinoaks 7-8619

Circle 696 on Page 53

Obituary

Bradley Stoughton, 86, professor emeritus of mechanical engineering at Lehigh University, died Dec. 30 in Bethlehem, Pa. The recipient of degrees from MIT and Yale, he was a consulting metallurgist for 21 years before joining Lehigh in 1923. During the war Prof. Stoughton headed the Heat Treating Equipment Section of the Tools Division, War Production Board, and for a time was acting chief of the Foundry Equipment and Supplies Section. He was a past national president of the American Society for Metals.

O. DeGray Vanderbilt Jr., 75, board chairman, Taylor Wharton Iron & Steel Co., and president of Weir Kilby Corp., Cincinnati, its affiliate, died Jan. 22.

John E. Stock, 55, superintendent of foundry processes and methods, John Deere Waterloo Tractor Works, Waterloo, Iowa, died recently. He joined the company in 1949. Previously he was with Dow Chemical Co., and Wenona Brass & Aluminum Co., Bay City, Mich., and Wilson Foundry, Pontiac, Mich.

George H. Hammon, secretary and superintendent, Fairfield Aluminum Castings Co., Fairfield, Iowa, died recently. He also served as purchasing agent. Mr. Hammon was one of the founders of the company in 1945. Previously he was with Iowa Malleable Iron Co., Fairfield.

Arthur N. Hayes, 82, former manager, Johnston & Jennings Foundry Corp., Chicago, died Jan. 26. He retired in 1951, after 55 years with the company.

John D. Ramsay, 83, former president, North American Refractories Co., Cleveland, died Jan. 31. In 1929 when several companies merged to become the present refractories company, he was made president. Mr. Ramsay became board chairman in 1947, and retired in 1949.

John W. Horner Sr., 81, president, Slack-Horner Brass Mfg. Co., Longmont, Colo., died Dec. 31. He joined the Benjamin F. Slack Brass Mfg. Co. in 1907, later became a partner and, following incorporation, became its president.

Emanuel Singer, 53, vice president and a director, H. Kramer & Co., Chicago, died Jan. 12, in Miami Beach, Fla., while attending the national convention of the Institute of Scrap Iron and Steel. He was a former president of the Secondary Metal Institute.

Fredrick C. Sammons, Los Angeles district manager, General Refractories Co., Philadelphia, died Jan. 16. He joined the company in 1945 as West Coast operations manager.

Edward M. Falk, 51, sales manager, W. W. Sly Mfg. Co., Cleveland, died Jan. 8. He spent 22 years with the company.

Lazarus Chapman, 65, chairman of the board, H. Kramer & Co., Chicago smelters and refiners, died Jan. 15.

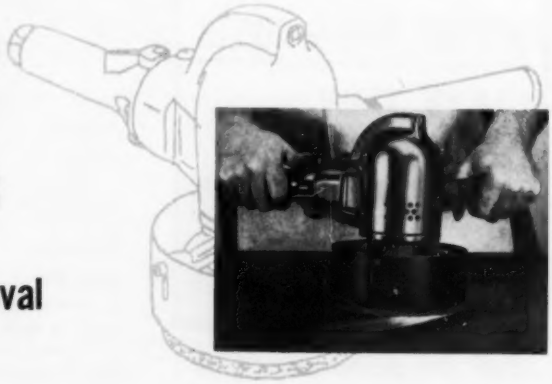
Book Review

1959 SAE Handbook, **cloth, 860 pages, 8½ x 11 in., published by the Society of Automotive Engineers Inc., 485 Lexington Ave., New York 17.**

Contains all new and revised reports prepared by SAE Technical Committees over an 18-month period. Book is divided into 10 sections covering ferrous metals; nonferrous metals; nonmetallic materials; threads, fasteners and common parts; electrical equipment; power plant components and accessories; passenger cars, trucks and buses; tractor and earthmoving equipment; marine equipment, and others.

In the ferrous metals sections, for gray iron, malleable iron, pearlitic malleable, nodular iron, and steel castings for automotive use are given. Those for aluminum-base alloy, copper-base, magnesium-base, and zinc-base die castings are presented in the nonferrous metal section.

it takes Airetool grinders to cut metal-removal costs



No matter what kind of a metal-removal problem you have, chances are you'll do it faster, cheaper with an Airetool grinder. Airetool makes all sizes and types of grinders — for every industrial need. You can choose the best grinder for your need. Get full details, write for Catalog 67. Or better yet, telephone us for a no-obligation demonstration in your plant.

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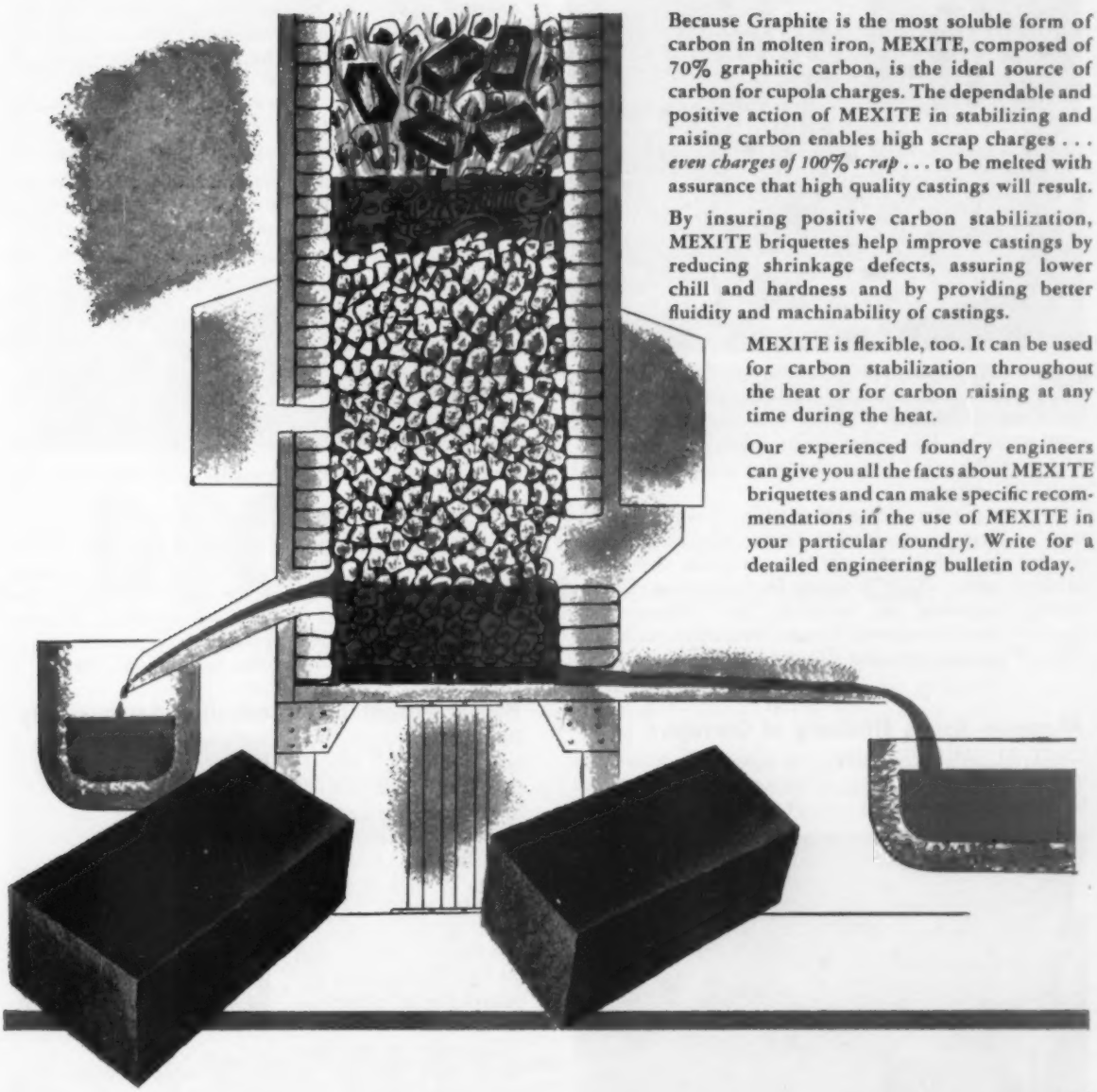
YOU CAN CHARGE MORE SCRAP IRON AND GET HIGH QUALITY CASTINGS WITH MEXITE® (GRAPHITE BRIQUETTE)



Because Graphite is the most soluble form of carbon in molten iron, MEXITE, composed of 70% graphitic carbon, is the ideal source of carbon for cupola charges. The dependable and positive action of MEXITE in stabilizing and raising carbon enables high scrap charges . . . *even charges of 100% scrap* . . . to be melted with assurance that high quality castings will result.

By insuring positive carbon stabilization, MEXITE briquettes help improve castings by reducing shrinkage defects, assuring lower chill and hardness and by providing better fluidity and machinability of castings.

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DIVISION OF THE WICKES CORPORATION, SAGINAW 14, MICHIGAN

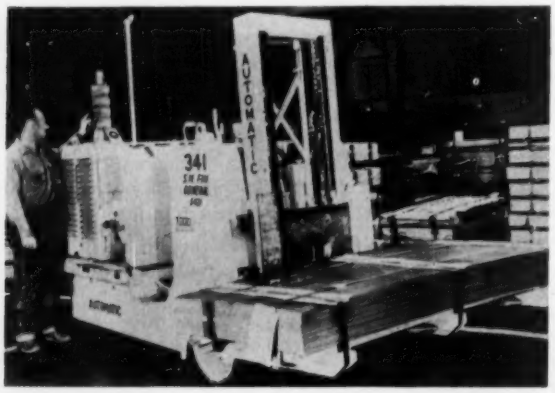
GRAPHITAR® CARBON-GRAPHITE • GRAMIX® POWDER METALLURGY • MEXICAN® GRAPHITE PRODUCTS • USG® BRUSHES

Circle 698 on Page 53

The Shakeout

Purifiers Eliminate Fume Concentrations

LPG POWER UNITS on 17 fork trucks at Gary Sheet & Tin Mill, United States Steel Corp., Gary, Ind., have been fitted with catalytic exhaust purifiers to eliminate



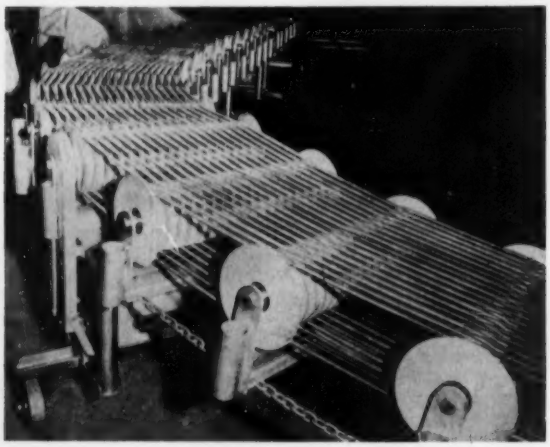
a potential problem of exhaust fume concentrations. These purifiers are made by Oxy-Catalyst Inc., Wayne, Pa. Tests established a 98 per cent reduction in CO, a 96 to 98 per cent reduction in aldehydes, and elimination of the ethyl mercaptan odor usually associated with LPG engines.

Exhaust purifiers, installed in place of regular acoustical mufflers on combustion engine equipment, operate by channeling the hot exhaust gases through a catalytic agent. This promotes an oxidation reaction which, occurring at relatively low temperatures, changes the incompletely burned contaminants in the exhaust gases to harmless CO_2 and water vapor.

For More Details Circle No. 517—Page 53

Aluminum Raises Efficiency of Conveyors

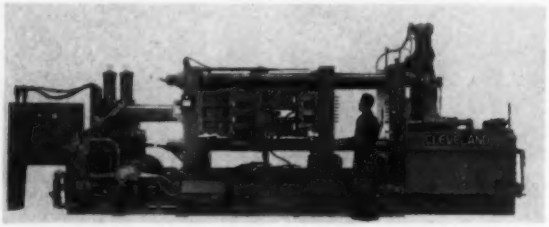
CAST ALUMINUM rollers (of alloy 319) reduce the weight of portable, power conveyors. Belt grooves can be made deeper to assure secure action. The manufacturer of this conveyor, Power-Curve Conveyor Co., Denver, found the alloy capable of machining and abrasion-resistant. Production costs are low. This unit for bag loading can move up to thirty 200-lb bags per minute. Conveyor can be curved to 90 degrees and adjusted to different degrees without stopping the motor. Loading device is reversible and will automatically adjust to the height of the loading dock, truck and boxcar.



For More Details Circle No. 518—Page 53

Japanese Diecaster Buys Big Zinc Machine

THE 850-TON hot chamber diecasting machine shown here is believed to be the largest ever exported from the United States. Built by Cleveland Automatic Machine Co., Cincinnati, it recently was shipped to the Showa Die Cast Co., Tokyo.

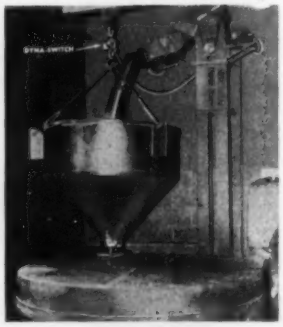


The machine weighs about 75,000 lb and is capable of making zinc castings up to 30 x 40 in. in size and as heavy as 47½ lb. To prepare it for export, a metal skid was designed to support the machine's weight. The box in which the unit was shipped was about the same size as an ordinary two-car garage.

For More Details Circle No. 519—Page 53

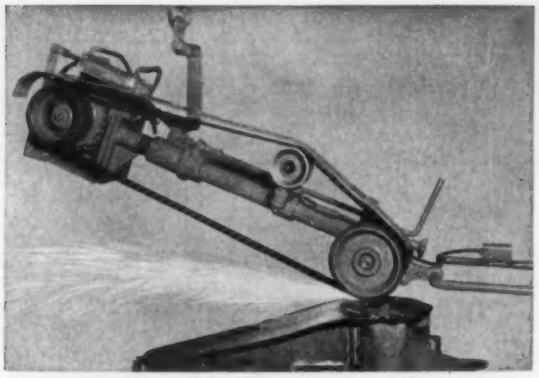
Hopper Weight Cycle Controlled Automatically

BY SUSPENDING a large hopper directly from a Dillon Dyna-Switch, engineers at Production Pattern & Foundry Co., Chicopee, Mass., devised a system whereby weight of material in the hopper is accurately sensed and the contents released automatically at point desired.



Conveyor at the right moves sand through pipe into the hopper. When hopper weight reaches the preset load point, the switch opens the conveyor circuit, stopping sand flow. Simultaneously, a trap at the bottom of the hopper opens and stays open, due to time-delay relay, until the hopper is empty. Conveyor motor circuit is closed each time the load is released. This cycle repeats endlessly.

For More Details Circle No. 520—Page 53



Does the Big, Tough, Difficult Jobs: Quickly and Easily

Nothing can remove metal as fast as the G & P Heavy Duty and XTRA Heavy Duty abrasive belt grinders. Free bulletin gives you full details, specifications and examples of special applications. Available in many belt sizes, various speeds and adjustable air tensioning for quick belt change and maximum belt life. Write for informative Bulletin No. 110.

Grinding and Polishing Machinery Corp.
SUCCESSORS TO VONNEGUT MOULDER CORPORATION

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Circle 699 on Page 53

SCIENTIFIC

***GEFSCORP**
Pressure Cast
MATCHPLATES

HOLDS LIKE A VISE TO PREVENT MOLD SHIFT* FROM CONVEYOR LINE JOLTS OR ROUGH HANDLING

WHY NOT SAMPLE TEST THEM ?

THE SCIENTIFIC CAST PRODUCTS CORP.
1390 E. 40th, Cleveland — 2520 W. Lake, Chicago

*Mf'd under license from General Foundry Services Corp.

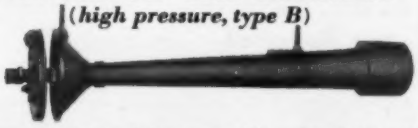
Circle 700 on Page 53

DFC BURNERS

Simple, Rugged, Low Cost

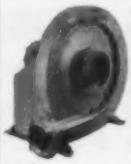
37 DFC Burners engineered for easy, low cost, maintenance-free operation, through long years of hard use. Atmospheric, high and low pressure inspirator, portable, tunnel, gas burners, gas-air mixers, oil burners and blowers. 80 years of burner experience...if you've got a burner problem, let us help you solve it.

INSPIRATOR GAS BURNERS
(high pressure, type B)



Applications: Designed for use with natural or manufactured gas under **2 to 25 PSI.** Gives operational economy at low initial investment for boilers, dryers, heaters, incinerators, industrial furnaces, kilns, petroleum processing equipment and roasters. Nine sizes, from 80 to 24,000 cubic feet of 1,000 BTU gas per hour under pressures of 2 to 25 PSI.

Auto-Ratio Proportioning Oil Burner: Automatically maintains accurate air-oil ratio over entire range. Remarkable turn down ratio—up to 20 to 1. For dryers, heaters, industrial furnaces, kilns and roasters.



Centrifugal Motor Blowers: Low pressure blowers with double inlet and 16-oz. positive pressure series with single inlet, used as source of combustion air for industrial burner systems on boilers, dryers, kilns, industrial furnaces, petroleum processing equipment and roasters.

There's a DFC Burner to meet your requirements

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CALL OR WRITE FOR FULL INFORMATION

Denver Fire Clay Company

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Please send me further information on your full line of Industrial Burners.

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Circle 701 on Page 53

"BRANFORD"

Since 1915

AN EIGHT LETTER WORD FOR

GUTS!

MAN SIZED

NEVER SEND A BOY TO DO A MAN'S WORK

LONG STROKE VIBRATORS

2"—1" Stroke	3" to 6"—2" Stroke
2½"—1½" Stroke	6" & 8"—3" Stroke

And Heavier Pistons Too

MORE IMPACT!

That's What Counts

"BRANFORD" 1915 BRANFORD VIBRATORS U.S.A.

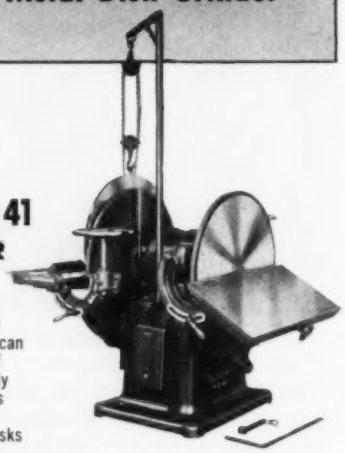
WRITE FOR CAT. BOX 427

Company NEW BRITAIN, CONN.

Circle 702 on Page 53

Sturdy Sander for Pattern Shops Doubles as Metal Disk Grinder

"OLIVER" No. 41 SANDER



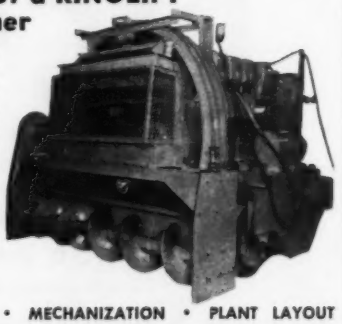
Here's a sturdy, soundly engineered sander that can handle a wide variety of pattern shop jobs quickly and efficiently. Base has wide flange for rigid support on floor. Two disks are 37½" in diameter, are made of steel plate finished all over and are balanced accurately. One man can change a disk. Sander has fine safety features. Tables are 46" long, 20" wide, have lateral adjustment of 2" and angular adjustment of 45 degrees. Send for folder giving complete technical details.

OLIVER MACHINERY COMPANY
GRAND RAPIDS 2, MICHIGAN

Circle 703 on Page 53

DON'T TAKE OUR WORD FOR IT! Ask Any User of a RINGLIFT Sand Conditioner

The Ringlift does a far better job while cutting costs — ask any user (names on request). The Ringlift picks up the sand, cools, screens and aerates it, magnetically separates metal, moistens sand and returns it to the floor in neat windrows. Ask for literature.



STATES ENGINEERING CORPORATION
245 E. Murray St.
Fort Wayne, Indiana

SAND PREPARATION • MECHANIZATION • PLANT LAYOUT

Circle 704 on Page 53

FOUNDRY

EDWIN S. CARMAN, INC.

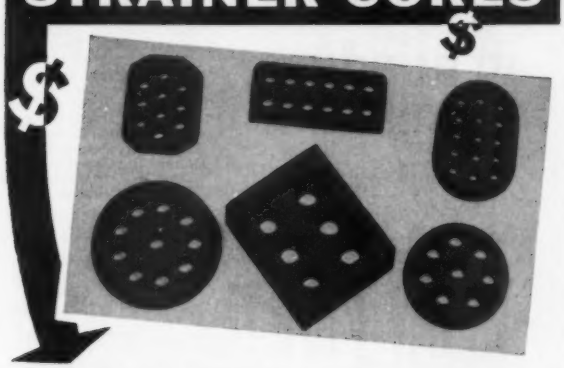
LEE ROAD AT MAYFIELD
CLEVELAND 18, OHIO

A COMPLETE FOUNDRY SERVICE

MECHANIZATION

Circle 705 on Page 53

Save Money with RUDOW STRAINER CORES



Custom Made • Will Duplicate Your Sample or Drawing • Unlimited Design Range • High Heat Resistance • Extra Hard • Saves Time—Trouble

RUDOW quality Strainer Cores cut rejects, cut costs, keep castings free of oxides, slag and impurities—simplify gating control and metal flow, for greater production. We offer you *Free Samples* of RUDOW Strainer Cores—made like your sample, or from your drawing. Write today—or phone MAin 6-1163.

SEND FOR FREE BULLETINS, PRICES ETC.

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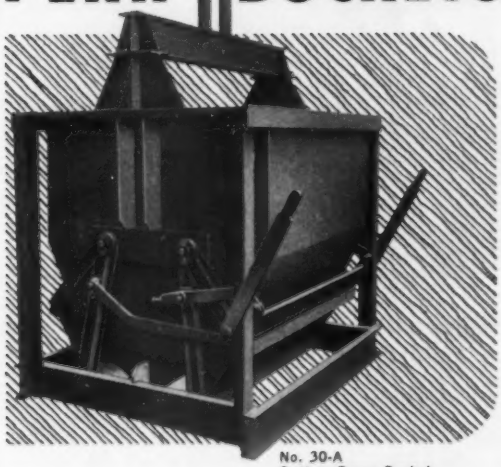
Circle 706 on Page 53

PENN BUCKETS



No. 30-A
Bottom Dump Bucket

Exclusive design makes this bottom dump bucket easy to operate . . . easy to open. Efficient for foundry use in handling all types of sand, moulding or core, dry or prepared. Can be used with coke, scrap iron and castings also. Sizes 7 to 200 cu. ft.

Write Today for Catalog • Prices Quoted on Application

PENN IRON WORKS, INC.
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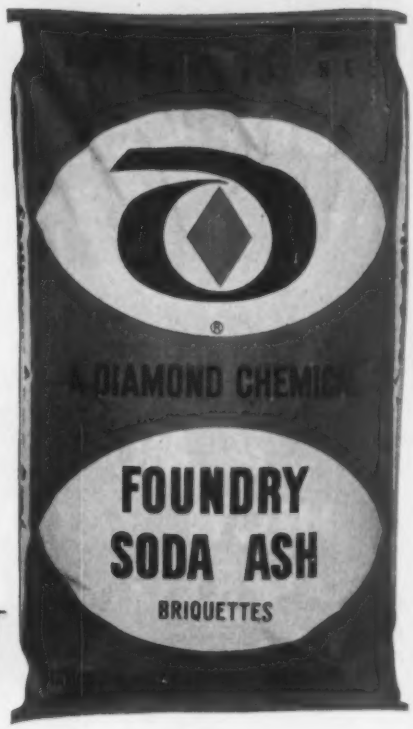
Circle 707 on Page 53

NEW



DIAMOND FOUNDRY SODA ASH BRIQUETTES

for fast, efficient, desulphurizing action

No inactive ingredients to add to cost. Pillow shaped for easy handling and fast, efficient desulphurization of molten metal in cupola or ladle. Diamond Foundry Soda Ash Briquettes permit greater use of scrap metal in melting, release entrapped gases and increase fluidity. Tough, moisture-proof 100-lb. bags keep them dry, effective and safer to use.

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call your nearest Diamond sales office.
Diamond Alkali Company, Cleveland 14, Ohio

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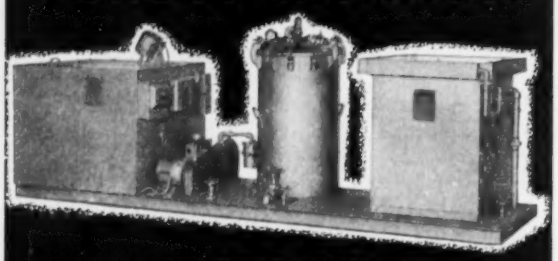
20 N. Wacker Dr. Chicago 6, Ill. STate 2-9550	Oliver Building Pittsburgh 22, Pa. GRant 7-7500	Box 2088 DeSoto Station Memphis, Tenn. BRoadway 2-1736
633 Penton Bldg. Cleveland 13, Ohio SUperior 1-8683	1006 Main St. Houston 2, Texas FAirfax 3-7329	99 Park Avenue New York 16, N. Y. OXford 7-0440

Diamond Chemicals

Circle 708 on Page 53

SAVE
POROUS CASTINGS!



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Complete packaged MOGULLIZING unit with extremely high vacuum (29" or more)

- hooks up to your utilities for immediate operation . . . saves costly installation
- removes ALL air and moisture from casting to be sealed . . . assures positive penetration of impregnant
- impregnates into most minute porosity by powerful vacuum action
- intensifies further penetration of impregnating material by use of air pressure
- use MOGUL CAST SEAL COLLOIDAL for the economical salvage of porous castings
- can also be used with polyester, vinylite, lacquer, wax, varnish, oil, styrene, phenolic resins

MOGUL®

Get the full details on the LOW-COST MONEY-MAKER METHOD OF SALVAGING REJECTS!
Write for illustrated BROCHURE now!
or PHONE SAcramento 2-3710

METALLIZING Company
OF AMERICA, INC.
3520 W. Carroll Ave., Chicago 24, Illinois

keep air CLEAN in grinding rooms with famous WOLVERINE DOWN DRAFT dust collecting benches

Downward streams of air, with velocities from 300 to 800 feet per minute, as operation requires, pulled through open grating working surface drive dust from grinding, polishing and sanding into rear compartment. There the dust is removed by heavy duty viscous filter. An axial flow fan at top exhausts cleaned air vertically to room or thru duct to outside if required. The perfect dust collecting and air cleaning system for grinding, polishing and sanding operations.

Type B
Model 2-32B

WOLVERINE EQUIPMENT CO.
31 MAIN STREET, CAMBRIDGE 42, MASS.

Write for bulletin describing the Wolverine Standard (above) and new Turntable Down Draft Dust Collecting Benches. Dept. F.

Circle 710 on Page 53

CAST CENTRIFUGALLY

HEAVY DUTY
MODEL K

SPECIALLY SUITED TO PRODUCE FERROUS AND NON-FERROUS LONG TUBULAR CASTINGS

Castings up to 32 inches in diameter and 20 feet in length. These machines are ideal for jobbing foundry work as well as production.

Cast tubes of all alloys of non-ferrous metal as well as cast iron, alloy irons, steel, alloy steels and stainless steels.

Highly efficient type of water-cooling for permanent molds.

Trunnion machines built in many size ranges for specific requirements.

Illustrated Folder No. 160 Available on Request.

CENTRIFUGAL CASTING MACHINE CO.
P. O. BOX 947 TULSA 1, OKLAHOMA

Circle 709 on Page 53

Circle 711 on Page 53

"OPTIX" The Universal Optical PYROMETER

Weight 3 lbs.

This precision made partial Radiation Optical Pyrometer is time-proven by over 30 years of use in foundries throughout the world. Unique design combines all mechanical and optical parts within a handy telescope type housing. Special Model for Molten Iron and Steel.

Write for literature on the above, and the following:

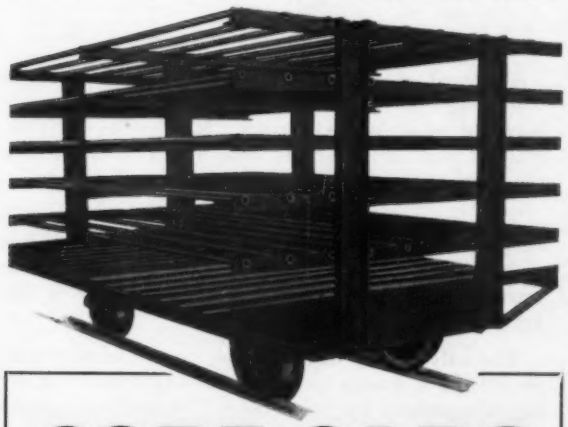
- *Color Pyrometer BIOPTIX* for direct reading of *true* and *black* temperature.
- *Portable Total Radiation Pyrometer "PYRO"* for annealing and hardening furnaces and baths.
- *Surface Contact Pyrometers* with a variety of tracers.

Single measuring range 1400-2500°F, or 1800-3400°F.	Double measuring range 1400-2000°F, and 1800 - 3400°F.	With supplementary range 3400-5400°F.
$210.00	**$268.00**	**$290.00**

EPIC INC.

150 Nassau St.,
New York 38, N. Y.
Digby 9-2470

Circle 712 on Page 53



CORE CARS
...RACKS...TRUCKS...

built to your specifications

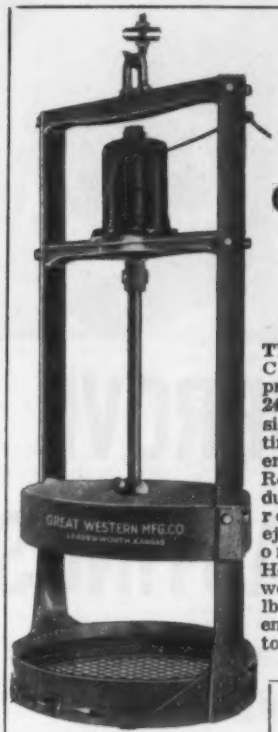
Chase handling equipment for core room use includes cars for any track gauge . . . racks for monorail or lift truck applications . . . trucks for handling heavy cores. Shelves are adjustable to fit the job at hand.

Send your drawing and specifications for a prompt estimate on well-built, long-lasting core cars, racks and trucks. Our Engineering Department is ready to help develop special equipment for your special needs.

Chase FOUNDRY & MANUFACTURING CO.

2900 Parsons Ave. Columbus 7, Ohio

Circle 713 on Page 53

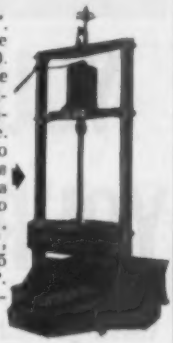


WORKS 160 HOURS EVERY SHIFT!

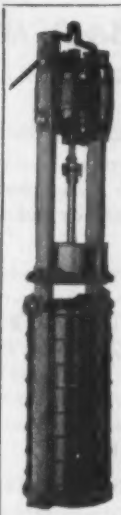
COMBS GYRATORY RIDDLES

"Greatest Name in Motion"

TYPE "CS". Complete price $395.00. 24" square sieve. A continuous operation sieve. Requires no dumping, as refuse is ejected off to one side. Height 4'10", weight 295 lbs, ½ H.P. enclosed motor.

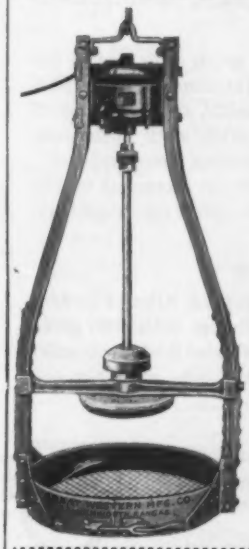


TYPE "CR". Complete price $385.00. 24" dia. round sieve. Sifts, fluffs, mixes, aerates sand. Height 4'6", weight 250 lbs., 1/3 H.P. enclosed motor



TYPE "HL". Price $285.00 complete, less sieves. Laboratory model especially designed for laboratory sand control, fitted with 1/6 H.P. enclosed motor.

PROMPT DELIVERY from your Foundry Supply House



TYPE "V". Price, 20" Sieve, $300.00. Does the work of 10 men. Screens sand, Fine, Medium, and Coarse. 20" dia. sieve with special clamp for 5-second changes. Height 4'6", weight 100 lbs., fully-enclosed 1/6 H.P. motor. Also available in Giant V-5 with 36" sieve for triple capacity . . . Price $545.00.

MAIL THE COUPON NOW!

GREAT WESTERN MFG. CO.

Leavenworth, Kansas Phone MU-22291

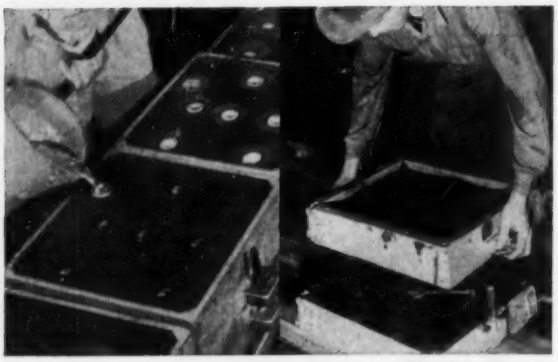
☐ Send Additional FREE Information

NAME

ADDRESS

CITY STATE

Circle 714 on Page 53



YOU IMPROVE YOUR CASTINGS

when you cast aluminum and magnesium with B&A® Alkali Fluoborates

(and Potassium Titanium Fluoride)

WHEN YOU CAST ALUMINUM

You can remove oxides and improve molten fluidity with B&A Potassium Fluoborate. It acts as a purifying flux and degassing agent . . . forms a dry dross.

You can produce a better grain structure in the casting by subsequent treatment with B&A Potassium Titanium Fluoride, or a mixture of Potassium Titanium Fluoride with Potassium Fluoborate (for lower melting temperatures). This improved grain results in increased tensile strength, greater elongation, better machinability, and other advantages.

WHEN YOU CAST MAGNESIUM

You can reduce rejects with B&A Alkali Fluoborates used as oxidation inhibitors with both green sand and core sand. You will also find cores easier to make and easier to shake out—and they collapse faster.

For further information, test samples, or technical assistance, write today on your company letterhead.

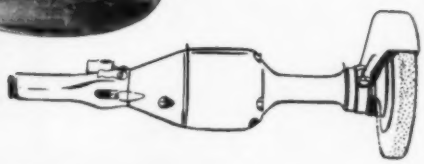
Allied Chemical

GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N. Y.

BAKER & ADAMSON® Fine Chemicals

KNOW THE FACTS ABOUT AIR TOOL PROTECTION

Ordinary oil separates from water



NON-FLUID OIL
TRADE MARK REGISTERED

emulsifies with water

We want to appeal to your logic. We believe you will agree that the major part of air tool maintenance is caused by air-borne moisture. "NR" grades of NON-FLUID OIL are made to absorb this moisture into the lubricating film. *"If you can't lick it —join it!"*

This action results in prevention of gumming and sticking which causes loss of power and speed. When tools are out of service, they are fully rustproofed because there isn't any moisture inside tools as a free agent to start rusting and corrosion.

The only change required from present maintenance practices is a change to a lubricant engineered and designed especially for this service. The improved results show up in seconds, not weeks or months.

Write for free testing sample and bulletin No. 550.

NEW YORK & NEW JERSEY LUBRICANT COMPANY

292 Madison Ave., New York 17, N. Y.

WORKS: NEWARK, N. J.

WAREHOUSES

Birmingham, Ala.	Charlotte, N.C.	Springfield, Mass.	Providence, R.I.
Atlanta, Ga.	Greenville, S.C.	Greensboro, N.C.	St. Louis, Mo.
Columbus, Ga.	Chicago, Ill.	Detroit, Mich.	

Also represented in principal industrial centers, including Pittsburgh, Pa., Cleveland and Cincinnati, Ohio

NON-FLUID OIL is not the name of a general class of lubricants, but is a specific product of our manufacture. So-called grease imitations of NON-FLUID OIL often prove dangerous and costly to use.

Circle 718 on Page 53

Circle 719 on Page 53

CLASSIFIED ADVERTISING

• HELP WANTED

FOUNDRY QUALITY CONTROL

Must be able of assuming full responsibility of production of all of our miscellaneous gray iron castings. Job will require full knowledge of cope and drag work, match plate, gating and pouring control and core work.

Person filling this position will report directly to the Plant Manager.

Send full resume of past experience and salary requirements to:

PERSONNEL DIRECTOR
MUSKEGON PISTON RING COMPANY
E. GARDNER ST.
SPARTA, MICH.

SUPERINTENDENT

For gray iron foundry 35 miles from New York. Sand slinger and rollover experience, 79 men. Knowledge ductile iron, bronze and aluminum desirable. Salary to start $10,000. In reply give complete record and availability. Address: Box 232, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

METALLURGIST

B.S. Degree. Recent graduate with up to 3 years experience preferred. Duties would include supervision of Applied Research on projects related to nonferrous investment castings. Plant located in New England. Salary commensurate with qualifications

BOX 234, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

PLANT SUPERINTENDENT

To produce quality ferrous and nonferrous castings and machine them to customers' specifications. Will supervise:

Foundry superintendent—100 employees
Machine shop superintendent—100 employees
Maintenance superintendent—35 employees

Production control, purchasing and stores, personnel and labor relations.

Age—35 to 45. Location—Middle West
Send resume and salary requirements to:

BOX 228, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

METALLURGIST

Required by progressive and expanding internationally known company manufacturing specialized chemical products for the foundry industry. Applicant should preferably be under 35, possess a metallurgical degree and have had several years' experience in foundry work. Thorough knowledge of casting defects, metallography and photography is essential. The position offers prospects of advancement for an able man and a good starting salary will be paid. Applicants should submit a resume of qualifications to:

FOUNDRY SERVICES, INC.
P. O. BOX 8728
CLEVELAND 35, OHIO

FOUNDRY ENGINEER

$9,000-$10,000

Young engineer, interested in assured future with a rapidly expanding, progressive foundry where competence is rewarded with advancement. Client pays all expenses. Contact Bill Newell.

MONARCH PERSONNEL
28 EAST JACKSON BLVD. CHICAGO 4, ILL.

OPPORTUNITY

For man capable of taking over, starting and operating small shop making only bronze markers. Must be able to operate furnace and do casting and finishing. Address: Box 229, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY SUPPLY HOUSE

Covering Michigan, Minnesota, Illinois, Wisconsin, Missouri to represent old line manufacturer of ferrous foundry riser compound. Write with complete particulars to: Box 213, FOUNDRY, Cleveland 13, Ohio.

• HELP WANTED

METALLURGIST

Graduate metallurgist preferably with some experience in steel foundry operations. Exceptional opportunity in a modern progressive, medium-sized steel foundry associated with a malleable and ductile foundry and machine shop in the southwest area. A wide range of operations in carbon, low alloy, stainless, and wear-resistant steels. Reply with complete details, including salary expected, reference, and recent photograph.

BOX 233, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

MANAGER AND TECHNICAL SUPERINTENDENT

Desires aggressive man with gray iron, white iron and ni-hard background to be in complete charge of California foundry with 200 ton per month capacity. Must have managerial capabilities, technical knowledge and some sales ability. Salary and bonus open and subject to negotiation together with liberal stock option. Present owner desires to retire in near future. Reply should include resume of experience, education and references from past employers. Address: Box 195 FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

PROJECT ENGINEER

Preferably with engineering degree and about ten or more years' experience in plant engineering. Should have foundry or steel mill background and no aversion to part time drafting design work. Position is one of real challenge, of much potential and will pay well. The opportunity is with a leading steel foundry in the East. Please furnish resume to:

BOX 198, FOUNDRY
PENTON BLDG., CLEVELAND 13, OHIO

SALESMEN—GRAY IRON AND ALLOY CASTINGS

Expanding modern Eastern foundry and machine shop has several good territories in East and Middle West. Excellent opportunity with old established company. Submit experience, area covered, etc. in strictest confidence. Address: Box 220, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

GENERAL CLEANING ROOM FOREMAN

Desire man 30-40 years of age with necessary drive and skill to organize department. Must have knowledge of the various cleaning room processes including welding, heat treating, arcair and materials handling methods. Reply giving age, resume of experience, personal background and salary requirements. All replies held in confidence:

WORKS MANAGER
MINNEAPOLIS ELECTRIC STEEL CASTINGS COMPANY
3800 N. E. FIFTH STREET
MINNEAPOLIS 21, MINNESOTA

ENGINEER

With substantial foundry design and layout experience. Knowledge of modern materials handling equipment and material flows required. Real opportunity with excellent salary, bonus and profit sharing. Degree is essential. Send complete details in confidence.

BOX 224, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

METALLURGIST

B.S. Degree. A recent graduate or a man with several years experience. We produce gray iron and ductile. Please provide complete background in first letter including references and salary desired. Colorado location. Address: Box 202, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

• HELP WANTED

FOUNDRY SALESMAN

Large gray iron foundry in New England needs foundry salesman for New Jersey and Pennsylvania area. Must have sales and gray iron foundry experience. Salary open. Address: Box 216, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY METALLURGIST

Modern, well established steel and gray iron foundry, located in Rochester, New York, has immediate opening for a metallurgist. Must be capable of taking complete charge of metallurgy and melting department, operating two electric furnaces of one and two-ton capacity. The company offers liberal benefits, including a profit-sharing plan. Please provide complete background in first letter, including references and salary desired. Address: Box 211, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SALESMAN

Experienced salesman to contact original equipment manufacturers in sale of iron castings. Must be able to recognize prospective customers and figure costs to be competitive. Should have a foundry background with some college training. Headquarters in central Wisconsin and service North Central States. Please give complete resume of experience in first reply. Address: Box 189, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

MANAGER, ASSISTANT

For cast iron plumbing fixture plant. Needs rounded out knowledge to back up manager. Address: P.O. Box 221, Columbus 16, Ohio.

FOUNDRY FOREMAN

At least five years' experience in supervision in Permanent Mold Foundry on both hydraulic and manual molds. Excellent employee benefits. Company located in southern Ohio. Please send complete resume to: Personnel Department, Aluminum Industries, Inc. 3670 Werk Road, Cincinnati 11, Ohio.

WANTED

Graduate engineer or metallurgist for iron casting sales and service. Must be under 34 years. Excellent opportunity with growing organization in Wisconsin. Address: Box 209, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

QUALITY CONTROL

Gray and ductile iron jobbing foundry located in Michigan requires a qualified and experienced person for metal and sand control. Must have a metallurgical background and practical foundry experience. State full particulars in reply. Address: Box 196, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY GENERAL FOREMAN

For a young and growing foundry in Ohio, producing aluminum and copper base sand castings. Requirements: 30-42 years of age; drive and initiative; experience and ability re modern production and jobbing techniques; metallurgical or engineering degree or background preferred but not a prerequisite. Opportunity for advancement. Reply in confidence to: Box 218, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

CHIEF ENGINEER

Graduate engineer preferred, or other with comparable experience and background will be considered, to supervise Engineering Department engaged in all phases of design, manufacture, plant layout of foundry equipment and installation of complete foundry automated molding lines of foundry equipment. Experience and proven background in machine design and foundry operation essential. Send complete resume to: Box 199, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY SUPERVISOR

Progressive Central Ohio Foundry has an opening for an experienced supervisor. Must be a journeyman and have had sand mixing, heavy dry sand molding and ferrous foundry experience. Excellent employee benefits and opportunities. Furnish resume stating education, experience, and qualifications. Salary open. Address: Box 236, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SALESMAN

With following among ferrous foundries to sell established national foundry product for Michigan, Minnesota, Illinois, Wisconsin territory. Write complete background, experience. Address: Box 212, FOUNDRY, Cleveland 13, Ohio.

• POSITIONS WANTED

FOUNDRY SUPERINTENDENT MANUFACTURING

Graduate foundryman experienced in all phases of gray iron mechanized foundry operations, up-to-date on latest developments and methods, cost and quality minded, now employed, desires relocation including overseas assignment. Address: Box 240, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY EXECUTIVE, MANAGER

EXCELLENT TECHNICAL AND PRACTICAL EXPERIENCE. FERROUS (INCL. DUCTILE IRON), NONFERROUS. METALLURGICAL ENGINEER, UNIVERSITY GRADUATE. KNOWS PROBLEMS OF EFFECTIVE ORGANIZATION. NOW EMPLOYED. AGE 45. DESIRES MORE RESPONSIBILITY AND CHALLENGE. JOBBING—PRODUCTION. LARGE OR SMALL CASTINGS. ADDRESS: BOX 235, FOUNDRY, PENTON BLDG., CLEVELAND 13, OHIO.

PRACTICAL FOUNDRYMAN

With metallurgical background, experience in all phases, light and heavy ferrous and nonferrous foundry operations, with low scrap rates. 36 years old with 16 years experience, presently employed as Plant Superintendent, wishing to relocate south or southwest. Address: Box 191, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

INDUSTRIAL EXECUTIVE

Experienced in all phases of selling and manufacturing at top management level. Graduate engineer; "C" process specialist; able administrator capable of establishing new division or profitably operating and expanding existing facility. Married, age 45. Presently located midwest but willing relocate home or abroad. Address: Box 201, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SUPERINTENDENT

Thirty-four years' experience, ferrous and nonferrous, practical and technical, twenty years' supervisor. Prefer small shop. Now employed. Age 55. Address: Box 214, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY EXECUTIVE

Desires a management position in steel foundry. Forty-six years old. College degree. Twenty-three years in foundry. Experience in all phases of foundry supervision as well as production control and labor relations. Capable administrator at top management level. Address: Box 238, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SUPERINTENDENT OR MANAGER

Practical foundryman, nationally known for a job well done. Age 47. Good health. Now employed. Looking for more action ferrous for nonferrous, $15,000 minimum. Address: Box 203, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRYMAN

Competent and progressive foundryman with good record desires to make change. Will relocate. Address: Box 205, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOREMAN

Swedish foundryman with broad experience in jobbing and mechanized foundries. Ferrous and nonferrous. 24 years experience, 13 years supervision, in Sweden and U. S. A. Age 42, will relocate. Address: Box 194, FOUNDRY, Penton Bldg. Cleveland 13, Ohio.

FOREMAN OR SUPERVISOR

17 years experience in nonferrous—cleaning, core making, molding, melting, gating and pattern layout. Progressive. Will relocate. Address: Box 204, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Practical and technical 25 years' experience jobbing and production in gray iron and semi-steel foundry. Familiar with every phase. Address: Box 244, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

GENERAL FOREMAN CLEANINGROOM

Thoroughly experienced in all phases of cleaning-room operations. Now employed. Wishes to relocate. Would like position with future. Have good cost-quality, labor-relations record. Resume upon request. Address: Box 241, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOREMAN AND SUPERINTENDENT

Thoroughly experienced and expert on sands, facings and gating. Qualified for trouble-shooting with gray iron and alloys experience. Address: Box 230, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

• POSITIONS WANTED

REPRESENTATIVE AVAILABLE

Salesman-familiar casting buyers-New Jersey-New York. Estimator, correspondent, sales management. Jersey resident. High drawing. Address: Box 226, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRYMAN

Experienced in gray iron and nonferrous metals, mechanization, design, patternmaking, gating, risering, costs. Presently employed as pattern supervisor. Address: Box 237, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Thorough knowledge of all phases of nonferrous metals. Understand gating, jobbing, floor, machine and plumber supplies. Can also produce pressure tight and porous free castings. Know sand control and core room work. Address: Box 242, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

MELTING SUPERINTENDENT OR FOREMAN

Practical and technical expert. Twenty-eight years' experience producing carbon, low alloys, high tensile and most all types low and high stainless alloys, including low temperature impacts, for castings or remelt stock under rigid specifications. Electric arc furnaces, small and large acid or basic. Same in induction furnaces up to one ton. Supervisory experience up to fifty men with full confidence and respect. Top efficiency and quality in production. Available on short notice. Like to establish with sound, reliable progressive organization, small or large that appreciates aggressive efforts and ability with results. Age 47. Excellent health. Address: Box 231, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

• REPRESENTATIVES WANTED

SALESMAN

To sell foundry equipment and supplies for foundry supply house. Territory Illinois and Indiana. Car furnished. Send full resume to: Box 215, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SALESMAN

Wanted salesman that sells foundry supplies to handle molten metal thermocouples and pyrometers for nonferrous foundries. Good commissions and unlimited territory. Well-established instrument manufacturer.

ELEMATIC EQUIPMENT CORPORATION
6731 SOUTH CHICAGO AVENUE
CHICAGO 37, ILLINOIS

FOUNDRY MACHINERY SALES—INTERNATIONALLY KNOWN LINE

Key areas exclusive representation. This excellent, lucrative opportunity for sincere, conscientious men with sound foundry following. Please list present lines, references (contacted only with approval) and activities. Replies strictly confidential.

BOX 190, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

SALES REPRESENTATION

Magnesium and aluminum foundry wants top flight sales representation. Unlimited production capacity as to size and type of castings. Address: Box 192, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

MANUFACTURERS REPS—GRAY IRON AND ALLOY CASTINGS

Modern Eastern foundry desires top flight reps with good sales connections. Submit experience, area you cover, manufacturers represented, size of your group, etc. in strictest confidence. Address: Box 221, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SALES REPRESENTATIVE

Desired in New Jersey for Eastern Pennsylvania gray iron foundry which offers rough iron castings or castings plus complete machining, finishing and assembly facilities. Address: Box 188, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

SALES REPRESENTATION

Desired several Eastern, Southern areas. Established blastcleaning (dry and wet) equipment, supply manufacturer. Advise details, coverage, lines handled. Address: Box 222, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

REPRESENTATIVE WANTED

We would like a man who is currently calling on pattern shops and foundries to sell a complete line of pattern lacquers. Address: Box 227, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

• FOUNDRY CONSULTANTS

SHELL MOLD FOUNDRY & PATTERN CONSULTANTS

Let us iron out your shell foundry problems. We are thoroughly experienced in all phases of shell molding and shell core work. Many years of experience in shell pattern design. For full particulars, write to:

SHELL FOUNDRY CONSULTANTS
P. O. BOX #85
DEAL, NEW JERSEY

FOUNDRY CONSULTANT-NONFERROUS

Sand casting—permanent mold casting—centrifugal castings — in aluminum — brasses — bronzes —30% leaded bronze—aircraft quality bearings and castings. Address: ED JENKINS, 286 PENOBSCOTT BLDG., DETROIT 26, MICHIGAN, PHONE: WOODWARD 5-7947.

• WANTED-TO-BUY

SPECTROGRAPHIC EQUIPMENT

and other laboratory equipment. Will buy. Write full details:

JAMES W. WELDON LABORATORY
2315 HARRISON STREET
KANSAS CITY 8, MISSOURI

IF YOU OPERATE A FURNACE

We will purchase your scrap linings, retorts, conveyors, muffles, racks, etc. Any item made of nickel alloy. Write, Wire or Call:

WEINSTEIN COMPANY
610 W. 8th STREET
JAMESTOWN, NEW YORK
PHONE: 61-154

BAKER PERKINS MIXER

Wanted—100 gal. to 200 gal. working capacity. Prefer Sigma blades with external bearings.

THE FIBERITE CORPORATION
WINONA, MINNESOTA

WANTED

Used or Broken Silicon Carbide Grinding Wheels of any kind or size, regardless of bond. Will pay $35.00 per ton. Union Mining Co., 1st Nat'l. Bank Bldg., Pittsburgh 22, Pa.

WANTED

Interested in securing used Patterns Core Boxes and Flasks for production of Cast Iron Soil Pipe and Fittings. Must be in excellent condition. Quote prices by sizes. Address: Box 1080, Bolen Machine and Foundry, Grand Junction, Colorado.

MIXER WANTED

Used Simpson Intensive Sand Mixers, State size, condition and lowest cash price for immediate acceptance. Address: Box 206, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

WANTED

One good used late model #3, 3H or 3F Simpson Mixer—complete. Address: Box 210, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

• FOUNDRIES FOR SALE

JOBBING GRAY IRON FOUNDRY
Located near the Chicago area with good jobbing business and well established END PRODUCT being sold nationally to the plumbing and construction trade. Fine opportunity for company wanting business of this kind. Present management will assist new owners as needed. Address: Box 217, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOUNDRY FOR SALE
Magnesium and aluminum sand casting, fully equipped and operating. 5 Lindberg-Fisher gas furnaces. Capacity heat treat oven. Blue chip customers and backlog of work. Excellent metropolitan New York location. Land and buildings. Owner retiring. Price $160,000.00 over first mortgage. Address: Box 200, FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOR SALE
Gray iron foundry completely equipped and operating four days a week. Large building. Capacity from 15 to 25 tons per day. Experienced help available. Address: Wayne Shoopman, Augusta, Illinois.

ALUMINUM AND BRASS FOUNDRY
For sale. Fireproof building 7200 sq. ft. In profitable operation, bluechip customers of long standing. Vicinity of Milwaukee, Wisconsin. Address: Box 208, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

ALUMINUM, BRASS, BRONZE, MAGNESIUM
Foundry for sale. Not far from southern California area. Producing vital castings top defense program, for leading U. S. industries. 18,000 sq ft building. Owner retiring.

BOX 207, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

• REPRESENTATIVES WANTED

LICENSE/ROYALTY ARRANGEMENT FOR U.K.
Well established U.K. manufacturers of Foundry Chemicals (sand binders, fluxes, etc.) are interested in extending their range and would welcome offers of interesting products for the foundry industry to be manufactured under license/royalty arrangement.

BOX 225, FOUNDRY
PENTON BLDG. CLEVELAND 13, OHIO

FOUNDRY SUPPLIERS LIMITED, 25a COCKSPUR STREET, LONDON, S.W.1., ARE SEEKING ADDITIONAL AGENCY IN GREAT BRITAIN FOR LATEST FOUNDRY EQUIPMENT.

• FOR SALE

SAND BLAST EQUIPMENT
SELL—BUY—TRADE
GUARANTEED MACHINES
TERMS: 3 YEARS TO PAY

48 x 48 Wheelabrator Tum. w/loader.	$5000.00
42 x 48 Wheelabrator Tum. w/loader.	3750.00
27 x 36 Wheelabrator like new	4500.00
20 x 27 Wheelabrator like new	3500.00
4' Wheelabrator Table like new	3000.00
6' Wheelabrator Table	3500.00
9' LG Pangborn Table	5000.00
6' LG Pangborn Table	3500.00
4' LG Pangborn Table	3000.00
14' LG 5 Pangborn Table	9000.00
Pangborn Shop Peen Cabinet	1100.00
Pangborn 53 EN2 Hand Cabinet	325.00
Pangborn IGF Air Barrel	450.00
Rumelin 8 x 8 Room	1200.00

All types and sizes of Hand Cabinets, Dust Collectors, Pressure Tanks, Rooms, Vapor Blast Cabinets and additional sand blast equipment too numerous to mention.

DIAMOND SALES, INC.
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DETROIT 9, MICHIGAN
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FOUNDRY PERSONNEL SPECIALISTS

National Placement and Procurement of
GENERAL AND PLANT MANAGERS, PLANT SUPERINTENDENTS, FOREMEN—ALL DEPARTMENTS, METALLURGISTS, ENGINEERS, CONTROLLERS, ACCOUNTANTS, SALESMEN, SALES MANAGERS, PERSONNEL DIRECTORS, PURCHASING AGENTS
Confidential Inquiries Invited
From Employers and Qualified Applicants
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DRAKE PERSONNEL, INC. FINANCIAL 6-8700
JOHN COPE, DIRECTOR, 29 E. MADISON ST., CHICAGO 2, ILL.

• ENGINEERING SERVICE

SPECIAL SERVICE . . .
You may have a PROBLEM which you have been UNABLE TO RESOLVE with your own organization personnel. A problem that could be QUICKLY SOLVED in a month . . . a week . . . a day . . . BY A WELL-QUALIFIED MAN of experience. We have a man or men with many years of experience in the exact areas with which you are concerned. Representative areas include plant layout, modernization, operation, selection and installation of equipment, technical processes, metallurgy, personnel development, methods, etc. To help you, we assign individuals who have 40 or more years of actual experience in specialized fields . . . invaluable know-how, yours to command for as long as you need it. WRITE OR PHONE for detailed information.

WESTOVER SPECIAL SERVICE ASSOCIATES
3110 W. Fond du Lac Ave., Milwaukee 10, Wisconsin, Phone Custer 3-2121

• FOR SALE

PATTERN SHOP MACHINERY

Lathe, Heavy Duty Patternmakers, Oliver No. 22 Universal lathe with Head stock, tail stock and movable pedestal supported carriage, cross slide and compound mounted on T-slotted cast iron floor plate. Will turn 8' dia using carriage and cross slide.

Lathe, 14" Swing ball bearing crescent wood lathe. Motor in base, variable speed. Has Delta cross slide and compound mounted, 1 h.p., 220/440 volt, 60 cycle, 3 phase motor.

Jointer 12" Crescent ball bearing direct motor drive. 220/440 volt, 60 cycle, 3 phase, Excellent Condition.

Table Saw, 5 h.p., 220/440 volt, 60 cycle, 3 phase direct motor, drive tilt table, heavy duty. Good saw for flask or maintenance dept. Drill presses, jointers, saws, surface plates, electric hoists, other miscellaneous pattern shop equipment.

FREEMAN SUPPLY CO.
1152 EAST BROADWAY
TOLEDO 5, OHIO

FOR SALE
2—Model TD4 Taccone Molding Machines (automatic)
2—#9 Whiting Cupolas with Modern Swivel Type charger. Above equipment slightly used. Address: Box 223 FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOR SALE
Patterns—aluminum match plates—for ornamental novelty castings, door stops, animals, book ends, banks. Also fireplace dampers, cleanout doors, ash dumps. All in good condition. Reasonable. Address: Box 239, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

FOR SALE
BEST OFFER for 36" x 42" Wheelabrator Tumble Blast. Running condition. WRITE ONLY —Box 303, Agawam, Mass.

FOR SALE
BONDACTOR, Model 1250L, Cupola patching gun, like new, used 2½ years, complete with extra parts—new air motor, speed reducer, nozzle liners, etc. Address: Box 197, FOUNDRY, Penton Bldg., Cleveland 13, Ohio.

• FOR SALE

FOR SALE

Newaygo "Reddy-Sandy" Mod. RS-VM, complete
Newaygo Aerator, Size 18" x 30" Hi-capacity
Bucket Elevator on 20' centers 22—6" x 10" buckets
Walker Turner Metalcutting band saw 16" Throat, 8 speeds
Eclipse Reverberatory Furnace Model F2000G
Skip Hoist for No. 9½ Cupola
Osborn #405 Rollover
Vibrating Screens & Gyratory Riddles
International Rollover RES, Size 15"—6"
Milwaukee 163 Jolt Stripper
Champion J8L 12 Jolt, Squeeze, Pin Lift
Osborn 710J, Pin Lift
Osborn 212J, Jolt Squeezers
19 Core Blowers all types
SPO 113 Jolt Squeezer
International L8J, Jolt Squeezer
International PJ8, Jolt Squeezer
Milwaukee 104 Jolt Squeezers
Champion J8 108 Jolt Squeezer
Clark Front End Dump Trucks 4 cyl. Gasoline Engine, 54" x 58" x 19" Bed
SPO 506 Jolt Rollover, Pin Lift, Draw
SPO 110 Jolt Squeezer
International Rollover 24 x 10 G, Portable
International Rollover 30 x 8 no jolt
International Rollover 30 x 12 G.
International Pin Lift JOP
Davenport Pin Lifts
Cleco Floor 8 Master Power Bench Rammers
McLeod Rotary Sand Blast Table, 48"
Swing Grinders
Royer Sand Preparators NDS
B & P Preparators
American Sand Cutters, Model M
Grinders, ½ hp to 25 hp
Disc Grinders
Ladles from 50-5,000 lb.
Pouring Devices, 500 lb. to 1000 lb.
Tramrail & Switches
Air Hoists, 1000 lb. to 4000 lb.
Overhead chain conveyor #458, track, drives
Blowers—Centrifugal—positive—exhaust
17", 20", 28", 36" Spray Booth Fans
Spencer Turbo Compressor, 3600 CFM @ 24 oz., 40 Hp. Motor
AAF Dust Collector, Type N, Size 1¼, Wet
AAF Dust Collector, No. 40 Air Mat Dust Arrestor
Spencer Centrifugal Dust Collector, Multiple Vacuum Type, 300 CFM @ 5" of Hg., Vacuum
Pangborn Dust Collector, Cloth & Screen Type Size 11,000 CFM
27" x 36" American Wheelabrator Tum. Blast

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SLIP AND POP-OFF
JACKETS, ALUMINUM AND IRON
STEEL FLASKS
IRON CORE PLATES
MANY OTHER ITEMS IN STOCK
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Two *OUTSTANDING VALUES* from
UNIVERSAL

SAND HANDLING SYSTEM

NATIONAL ENGINEERING UNIT

Consisting of: No. 1½ Simpson U.D. Muller with water meter, National Screen Master Preparator, Skip bucket loaders, 20" x 20' belt conveyor, Bucket elevator, Sand storage bin, 5 Moulder's hoppers.

1957 unit in LIKE NEW CONDITION
Dismantled in our warehouse
Yours for Less than Half of today's replacement value!

SPECIAL RESEARCH TOOL

30 KW ECCO VACUUM FURNACE

Complete High Frequency Vacuum Melting Furnace of latest design.
Consisting of: 30 KW M.G. Set; Ecco High Frequency Control Cubicle; Kinney Model KD-110 Vacuum Pump; Pyrometer.
Dimensions: 7½" dia. x 13" high furnace in water cooled vacuum chamber 31" inside dia. x 42" high.

1954 unit used only 54 hours
In LIKE NEW CONDITION

PARTIAL LISTING OF OUR REGULAR REBUILT MACHINERY STOCK

AIR COMPRESSORS
1—75 hp INGERSOLL-RAND water cooled, horizontal
1—100 hp WORTHINGTON air cooled, 2 stage

BLOWERS
25—CENTRIFUGAL 16 oz., 2 to 5 HP
10—GE, WILBRAHAM - GREEN, FISHER Positive Pressure & Cent. Cupola Blowers

CLEANING EQUIPMENT & TUMBLING BARRELS
1—15" Cont. WHEELABRATOR Tumblast
1—26" Cont. WHEELABRATOR Tumblast
1—15" x 20" WHEELABRATOR Tumblast
1—20" x 27" WHEELABRATOR Tumblast
2—27" x 36" WHEELABRATOR Tumblast
1—36" x 42" WHEELABRATOR Tumblast
1—48" x 42" WHEELABRATOR Tumblast.
1—48" x 48" WHEELABRATOR Tumblast
1—24" WHEELABRATOR Swing Table
1—1-A WHEELABRATOR Multi-table
1—PANGBORN TABLAST, 8' Table
1—PANGBORN Air Blast Room
1—PANGBORN Skewed Roll Cabinet
1—RLY, 60" x 32" Round
4—RLY, 48" x 36" Round
1—WHEELABRATOR Peening Cabinet
1—48" WHEELABRATOR Swing Table

CONVEYORS
1—HEWITT-ROBINS Oscillating, 18" W x 40' L
1—HEWITT-ROBBINS Vibrating, 18" W x 10' L. Model VC-I
1—LINK-BELT Bucket Elevator, 8" x 12" buckets on 14" rubber belt, completely enclosed by 2' x 4" casing.
1—LINK-BELT, CAR type mold, 114 cars, 403' track, car size 18" x 42"
1—SIMPLICITY, 24" x 10" Feeder w/hopper, Model OA-10-JA2

CORE BLOWERS
1—CHAMPION CB-5, Bench Type
10—DEMMLER #1, #2, #2A, #3K, #4E
3—INTERNATIONAL SB-13
3—OSBORN #91, #192, #91-10
1—RANDALL MODEL "A." Bench Type
1—TACCONE #4D, 10" Draw Stroke Cyl.

DUST COLLECTORS
COMPLETE STOCK—both Wet & Bag Type —send us your requirements

FURNACES—DIRECT ARC MELTING
1—250 lb. LECTROMELT, Side Charge
1—500 lb. LECTROMELT, 200 KVA trans.
1—1000 lb. SWINDELL
1—2000 lb. HEROULT
1—2000 lb. SWINDELL, 3/60 1000 KVA.
1—1½ Ton HEROULT
1—3 Ton SWINDELL Hyd. Top Charge,

FURNACES—INDIRECT ARC
1—10# DETROIT
1—60# DETROIT
1—350# DETROIT LFA
1—750# DETROIT LPY, Conical Shell,
1—1000# DETROIT AAD P, 300 KVA
1—3000# Detroit C, 500 KVA

FURNACES—INDUCTION MELTING & HEATING
1—35 KVA AJAX 60 cy., alum.
1—35 KVA, AJAX SPARK GAP, High Freq., steel
1—1250 KW 2 Ton Cap.
1—5KW G.E. Tub- Type Induction Heater
1—30 KW LEPEL, water cooled spark gap

FURNACES—GAS & OIL
1—400# FISHER MNP, Gas Fired. Alum.
2—400# HAUSFELD hand tilt, Oil fired, alum or Magnesium
1—1 #900 JC STROMAN, gas, Like new
1—1200# Brass, MNP, Oil

FURNACES—HEAT TREAT
1—4' x 4' x 10' Gas Fired Annealing
1—9' x 12' Car Type, gas/oil
1—12" x 36" x 8" high HAYES "Certain Curtain"
1—7' Rotary G.E., 200 KW, 1950° F
1—36" x 36" WESTINGHOUSE Pit Type.

MOLDING MACHINES
Jolt Rollover Pattern Draw
1—HERMAN 10,000#, 48" x 109" table
1—HERMAN 6000#, 42" x 78"
2—HERMAN 7500#, 40" x 50" tables
1—HERMAN 7500#, 40" x 60" table
1—HERMAN 3000#, 30" x 64" table
1—HERMAN 3000#, 32" x 70", 15" cyl. series charging conveyor type
5—HERMAN 1500# to 40" x 48" tables
3—HERMAN 750#, 24" x 30" tables
1—INTERNATIONAL 30" x 12", Type G, 28" x 35" table
2—INTERNATIONAL, 13" x 17" tables
1—OSBORN #442, 21" x 31" table, 600#
1—OSBORN #602, 36" x 26", 900#
1—OSBORN #405, 3000#, flask size 64" x 57", 26" draw
4—TABOR 40" x 60", 1500 & 3000#
2—TABOR 30" x 40" w/air clamps, 1000#
1—TABOR 22" x 42" pattern draw, shockless, portable, 600#
1—TABOR 20" x 30" w/air clamps, 1000#
2—TABOR 14" x 14" Rockover 150#
1—TABOR 40" x 50" table, 3000# capacity

Plain Jolt
1—INTERNATIONAL, 3' x 4' table, 12" cylinder

Jolt Pin Lift
1—HERMAN #4317, 22" x 30" table
2—INTERNATIONAL JDP, 1200 x 8", 24" x 26" table, 8" draw, 1200#, port.
1—J & J #681-C, 30" x 25" table, 600#
1—OSBORN #559, 25" x 30" table, 6" draw, 1200#
2—SPO #305, 750 lb., 20" x 27" table
1—TABOR 20" x 24" table, 600#

Jolt Squeeze Pin Lift
2—INTERNATIONAL PKL, 20" x 28" table, 14" sq., 5½" draw
2—INTERNATIONAL PKL, 18" x 24" table, 12" sq., 5½" draw, stat.
2—MILWAUKEE #163, 15" x 24" table, 11" sq., 1500#
1—MILWAUKEE #165, 24" x 30" table, 16" squeeze, 1700#
1—NICHOLLS 18-44, 6½" draw.
5—OSBORN #712J, #712PJ, 18" x 28" table, 12" sq., 6" draw, stat. & port.
5—SPO #2114P, 21" x 27" table, 600#
2—SPO #2116, 21" x 27" table, 11" sq., 6" draw

Jolt Squeezers
2—INTERNATIONAL #12 IJS, 16" x 20"
4—INTERNATIONAL #10 IJS, 16" x 20"
10—OSBORN #275J, 16" x 20" table, 400# port.
3—TABOR Squeeze-In Head, 16" x 19" table

MATERIALS HANDLING
1—BYERS, Mobile Crane, BUDA Engine, 50' Boom, 5 ton w/magnet & bucket
1—HOUGH PAYLOADER, Model HA, 1000# cap., hyd. lift, mech. dump

MULLERS AND MIXERS
1—B&P #30 Speedmuller w/skip hoist, 3 cu. ft. batch
1—B&P #40 Speedmuller w/skip hoist, 5 cu. ft. batch
1—B&P #7 Mulbaro, 7 cu. ft. capacity
1—B&P #60 Speedmuller, 10 cu. ft. batch
1—B & P, Conventional, SIMPSON type, 87½" Dia. arranged for cooling
1—CLEARFIELD #404, 4' Dia, 4 cu ft batch
1—CLEARFIELD #610, 6' Dia., 10-14 cu ft. batch
1—SIMPSON #0, U.D. 3' Dia
1—SIMPSON #1, U.D., 4' dia., 4 cu. ft.
1—SIMPSON #2, 6' U.D. Dia 14 cu ft
2—SIMPSON #3, enc. gear, 20-25 cu. ft.
1—SIMPSON #3, 8' Dia. Open Gear, 20-25 cu ft batch
1—B&P #3½ Mulbaro, 3½ cu. ft. cap.

LADLES
Bottom Pour
4—MODERN, 49" x 49"
2—MODERN Crane Type, 55" H x 50" top
1—MODERN Crane Type, 60" H x 60" top

Lip Pour
1—WHITING 40" x 40" top dia. geared
1—WHITING 52" x 52" top dia. geared

Cylindrical
8—WHITING, 26" L x 25" dia., 1100# iron
7—WHITING, 19" L x 22" dia, 600# iron
3—WHITING, 38" L x 28" dia, 2200# iron

OVENS
1—COLEMAN, Gas, 2 Comp. and 5 drawers, O.D. 22" x 12' x 10'
1—GENRICH, Elec., 3 drawer, preheating, auto-control, 9' H x 8' W x 6'7" L
3—GENRICH, Elec. elevator type, Inspection under operation in N.Y.C.—Excellent Condition

SAND CONDITIONING
1—AMERICAN Sand Cutter, Model AA, 62" cutting reel
1—B & P Nite-Gang
2—B & P Screenarator, Model "B" & "M"
1—LINK-BELT Revivifier
1—MOULDER'S FRIEND, 50" cutting reel
2—ROYER, NC-2, 10-15 tons/hr, 1½ HP
1—ROYER NC-4, 10-15 tons/hr, 1½ Hp
1—ROYER PREPARATOR, Comb. Model NDC, 25 ton/hr scrap removal, 8' x 8' hopper
3—ROYERS, NDP, 15-25 tons/hr, 2 Hp
1—SIMPLICITY Type SORG 4' x 5' screen
1—ROYER Jr., 7-10 tons/hr., ½ Hp

SAND SLINGERS
1—B&P Stationary, 2 speed, 19" head, 4" tip with plate feeder
1—B&P Stationary, Single Speed
2—B&P Tractor Type 16" head
1—B & P Tractor Type, 19" head

MISCELLANEOUS
1—BLASTCRETE Model PM-1 Cupola Gun
1—200 KW, 230 volt D.C. MG Set
1—KANE & ROACH WIRE STRAIGHTENER, Model DX-5
FLASKS, CORE PLATES, All Sizes
1—CLIMAX Model 2-A Wire Straightener
10 or 15 HP GRINDERS, Swing Frame
8—GRINDERS, Double End, Pedestal Type, U. S., Cin., Gardner, 5, 7½ & 10 HP

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WORLD'S LARGEST INVENTORY OF GUARANTEED FOUNDRY EQUIPMENT

AIR & ELECTRIC HOISTS

85—I & R Air Motor type, sizes A, B, C, D, D-6 & E, ½, 1, 2, 3 & 5 ton.
15—DETROIT Air Hoists, 1, 1½, 5ton cap.
1—DETROIT Model LHR, 5 ton, elec.
20—THOR air hoists, ½, 1 & 2 ton cap.

BUCKET ELEVATORS

12—LINK-BELT & JEFFREY, 30, 40, 50, 60 ft. cc, 10 x 7, 12 x 7, 14 x 7, 16 x 8 buckets.

CUT-OFF MACHINES

1—TABOR C10AF, 16" wheel, 10 HP.
3—TESSEMER H & I Sprue Cutters.

CORE BLOWERS

3—CHAMPION Model CB-10, CB-18, & CB-400. From 10 to 300 lb. Cores.
22—DEMMLER #50 Model 1, 1E, 2, 2E, 2K, 3, 3E, 3K, 4 & 4E, 10 to 100 lb.
1—FEDERAL 40P-1 San-Blo.
7—INTERNATIONAL Model SB-11 & SB-13, SB-15H, 15 to 30 lb. Cores.
6—OSBORN Nos. 91, 92, 192 and 193. From 10 lb. to 75 lb. Cores.
2—REDFORD #2—Magazine type.
1—SAN-BLO Model CB-40-B, 40# Cores.
1—SPO Model SC-10-DM, hollow core.

CORE OVENS

1—INDUSTRIAL "Revolving Carriers" continuous, 18" x 50" trays.
2—PORBECK Batch type 10' L x 8' W.
1—DESPATCH Type "B" 6' w x 16½' l x 7½' h Oil Fired.
1—FOUNDRY EQUIP. 3 comp. 6' x 7' x 12' ea. Gas or oil.
1—THERMONIC Model M800A Dielectric. Cap. 900#s per hour.

CUPOLAS, BLOWERS & EQUIP.

1—SPENCER 150 HP 7500 CFM 48 oz.
6—I & R Centrifugal 30, 50, 85 and 100 HP. 3500 to 10,500 CFM w/blast gates.
1—CUPOLA Bondactor, style 1205-L.

ROTO-CLONES WET TYPE

9—AMERICAN AIR FILTER Type N&W, Sizes No. 20, 24, 27, & No. 30, w/sludge ejectors, cap. to 30,000 CFM.

ELECTRIC MELTING FURNACES

4—DETROIT LFA, 350# Cold Charge 700# Molten w/200 KVA transformers.
1—TOCCO 20 KW Induction, 9600 cycles.
3—AJAX No. 100 & 300 Furnaces Only.
6—AJAX 35 KW Induction 460 V 1 phase.
1—DETROIT Size CM—4000# Charge, 8000# Molten, w/1000 KVA trans.
2—AJAX 20 KW Hi Frequency Converters.

GAS & OIL FIRED FURNACES

23—LINDBERG FISHER Model MNP electric Tilt, Sizes 150, 400, 600, 1000, 1700, 2000 & 2400#, alum. cap. Gas or Oil.
29—LINDBERG & HAUSFELD Stationary, Sizes 100, 150, 200 & 550 cap.
1—LINDBERG #400 BBI hand tilt.
1—SKLEENAR 1200# Rev., hand tilt.
1—MONARCH 600# Rev., hand tilt.
1—STROMAN, "U" 600# Reverb.
1—STROMAN DC "Dipout" 800# cap.
1—ECLIPSE E1000—Double Chamber Dry Hearth 1000# cap.

GRINDERS

Swing Frame

1—FOX #4 Wheel 24" x 3"—20 HP
1—MARSCHKE 20" x 10" wheel, 10 HP.
3—MARSCHKE 24" x 3" wheel, 15 HP.
2—U. S. ELEC. Model 24, wheel 24" x 3".
1—MUMMERT-DIXON #2420, wheel 24" x 3".

Snagging

4—FOX #7—30" x 3" Wheel, 15 HP.
2—U. S. #64, 20" x 3", 7½ HP, 4 speed.
2—SAFETY #174, 24" x 3" wheel, 10 HP.
2—MARSCHKE 24" x 4" wheel, 20 HP.
1—U. S. #65, 30" x 3", 15 HP, 4 Speed.
U. S. No. 62VS, 24" wheel, 2-7½ HP motor, variable speed.

Core

2—MILWAUKEE 70-12, 70" dia. table.
1—STONEY Core Grinder, 16" dia. Wheel.

Horizontal Disc

GARDNER No. 124—53" wheel, 20 HP.
GARDNER No. 179, 70" dia. wheel, 40 HP.

LADLES

17—MODERN & WHITING Cylindrical Ladles, 275, 2450, & 3000 lbs. capacity. All Enclosed Gears.
37—MODERN & WHITING Lip Pour, Enclosed Gear, 1200, 1600, 2000, 4000, 6000, 7000, 8000 lbs. capacity.
7—MODERN & WHITING Mixing Ladles, 2 & 3 ton. Electric & Manual Tilting.

MOLDING MACHINES

Jolt Squeezers

12—OSBORN No. 275-J—17x20 Table, 10"
15—OSBORN No. 276-J—17x26 Table, 13"
2—OSBORN No. 216-PJ—21-32 Table, 16"
6—MILWAUKEE 123—17x26 Table, 12"
2—MILWAUKEE 181—24x36 Table, 18"
10—INT. PVJS—20x26 Table, 12" cyl.
9—SPO No. 110-J—17" x 20" Table, 10"
8—SPO No. 113-J—17" x 26" Table, 13"

Plain Jolt

1—J&J 50 x 72 Table—5000# cap.
2—OSBORN 60" x 72" table, 6000# cap.
1—TABOR 36" x 36" table, 1000# cap.

Jolt Rollover Pattern Draw

1—DAVENPORT 28A, 28" x 44" table.
1—DAVENPORT 28-SA, 29" x 40" table.
2—HERMAN 20" x 30"—750# series.
2—HERMAN 26" x 48"—1500# series.
2—HERMAN 50" x 60"—300# series.
2—HERMAN 40" x 48"—400# series.
1—HERMAN 60" x 84"—6000# series.
1—HERMAN 60" x 84"—10,000# series.
14—INTERNATIONAL TYPE G, Sizes 20" x 8", 24" x 10", and 30" x 8".
1—J & J #920 RC—44" x 54"—Hyd. head.
1—J & J #1020 RC—50" x 60"—Hyd. head.
2—J&J #612, 24" x 30" Table.
4—J&J #918, 44" x 54" Table.
1—J&J #815-B, 30" x 40" Table.
1—MILWAUKEE #167, 32" x 33" Table.
10—OSBORN #40 and 42 Core Rollovers.
1—OSBORN #442, 21" x 31" Table.
2—OSBORN #242W, 29" x 42" Table.
12—OSBORN #601 & 602, 30" & 36" Wide Flask, 10" draw, 750 lbs Cap.
2—OSBORN 643 Table 35" x 50"—2000#.
1—SPO No. 9546—26" x 32" Table.
1—SPO No. 917-A—40" x 29" Table.
1—SPO #413D, 24" x 28" Table.
1—SPO Model 508, table size 28" x 30".
1—SPO 5050, Table 25" x 30", 10" draw
3—TABOR 30" x 40" Table, 12" Draw.
4—TABOR 22" x 42" table, 10" Draw.

Jolt Pin Lift

2—DAVENPORT #34 AJS.
3—INTERNATIONAL JDP 1600 x 10" draw 36" x 36" Table.
2—INTERNATIONAL JDP 3000# x 10" Draw 48" x 48" table.
1—J & J #8125—30" x 38" Table—10" draw.
1—MILWAUKEE #2542.
2—J & J No. 688 25" x 30" table, 6" draw.
2—MILWAUKEE No. 1030—30x38 Table.
1—MILWAUKEE No. 1536 32x38 Table.
3—MILWAUKEE No. 3548—44x48 Table.
2—OSBORN #559, 25" x 30" table.
1—SPO #3058, 22" x 28" table, 8" draw
2—SPO #3070, Table 28" x 35", 10" draw

Pin Lift

2—B & P Model AL 2428 Speed Draw.
1—MILWAUKEE #620 ND Push
2—MILWAUKEE No. 195.
2—INTERNATIONAL #PK-16.

Jolt Squeeze Pin Lift

1—MILWAUKEE #125, 21" x 27" Table.
3—MILWAUKEE No. 165, 24" x 30" table.
3—MILWAUKEE #196, 17" x 38" Table.
1—OSBORN #712-V, 18" x 26" Table.
2—OSBORN #710-J, 17" x 21" Table.
9—OSBORN 714PJ, 20" x 31" Tables.
1—OSBORN #918—24x36 Table, 18" cyl.
1—MILWAUKEE #246—23¼x42 Table.
4—INTERNATIONAL PRL, 17" x 26".
1—SPO #2136-6.
2—SPO 2114P, Table 21" x 27", 11" cyl.
2—SPO 2160-R, Table 24" x 30", 16" cyl.

Shell Molding

1—SHALCO, Model HO4, 2 station.

CONVEYORS

Steel Apron

9—JEFFREY & LINK-BELT 24", 30", 36", widths. Lengths built to your specifications, with reducers & motors.

Oscillating & Vibrating

1—LINK-BELT 48" x 154', 20 HP Motor.
7—JEFFREY TAYLOR No. 5 Vibrating Feeders 24" wide x 7'.
LINK-BELT "FLEXMOUNT"
1—8" W x 50' L x 4" deep pan
2—18" W x 18' L x 4" deep pan
2—SIMPLICITY 24" W x 13' L x 6" Deep.
1—SIMPLICITY 18" W x 11' L x 6" Deep.
1—SIMPLICITY 24' w x 19' x 6".

Roller

2500' MATHEWS 6". 14" wide, 2⅞" dia. roller, 1¼" hex shaft, 4" channel.
1500—MATHEWS 8" wide, 3¼" dia. 1" hex shaft on 6" centers, 6" channel.

Mold

1—DUO-ROLL 88 Cars 20" x 48", 350' track, with automatic dumping.
1—PALMER "B" 106 Cars—42" x 62" w/550' Track.

Belt

LINK-BELT & JEFFREY 18", 24" & 30" wide. Flat or trough idlers, all Timken bearings. Built to your specifications. Can be equipped with molders hoppers & Ploughs.

HOPPERS & STORAGE BINS

1—NATIONAL ENGINEERING "Moulders Helper" 2 Hopper Unit.
7—NATIONAL & LINK-BELT Storage Bins, 60 to 150 tons cap.
1—NEWAYGO HS-7-GT, Handy Sandy.
42—MOLDERS Hoppers 1½ ton cap.

SAND MULLERS

3—B & P No. 80A Speed Muller—24 cu. ft. air cooled.
1—B&P #3½ Mulbaro, 3½ cu. ft.
1—B&P #30 Speedmullor, 4 cu. ft., w/skip Hoist Loader—Air Cooled.
1—B&P #50 Speedmullor, 9 cu. ft., w/skip Hoist Loader—Air Cooled.
1—B&P #60 Speedmullor, 12 cu. ft., w/skip Hoist Loader—Air Cooled.
1—B&P #70 Speedmullor, 18 cu. ft.
1—BESSER Paddle Type, 30 cu. ft.
1—CINCINNATI 24" muller.
2—CLEARFIELD No. 610 w/skip hoist loaders, 10 to 14 cu ft batch.
1—CLEARFIELD #404, 4 cu. ft. batch.
1—DRAVO-DOYLE 6 cu ft cap, Port.
1—LINK-BELT 48" x 8' Paddle Type.
2—MASTER 400# Shell Type 5' pan dia.
1—PEKAY No. 160-1-24 Mixer Muller, single stage for 24" belt, 230 TPH.
1—SIMPSON #1-H Style UD, 400# batch
2—SIMPSON #1½ style UD, 700# batch w/loader.
2—SIMPSON #2, Style C, 1500# w/loader.
3—SIMPSON #3, Style C, 3000 lb.
3—SIMPSON #3, Style UD, 3000 lb.
2—Mixer Muller, 6 cu ft paddle type.
1—LANCASTER No. EDG-4, 5 cu. ft.
1—LANCASTER #EA-4, 6 cu. ft. w/loader.

SAND PREPARATORS

6—B & P Screenerators, Models S, M & L.
8—ROYER Models, NC-4, NDS, NDP.
6—AMERICAN Sand Cutters, Model M, Sizes 79/60, 89/70, 99/80 All late.
4—AMERICAN Model AA and AM, 48" & 60" Cutting Blade.
1—AMERICAN "Sand Master," 102"/70" Cutting Blade—1952.
2—MOULDERS' FRIEND 50" & 60" Brush.
2—NEWAYGO RS-V Reddy Sandys.
1—SIMPLICITY LP 2' x 3' screen.

SANDSLINGERS

1—B&P 5-ton capacity Plate Feeder
2—B & P Tractor Type 19" head & 16" head, 13' arms, Magnetic towers.
6—B & P Models DB Stationary Sand Slingers, 16", 19" and 22" heads, with 20, 25, 40 and 50 HP motors. All late.
2—B & P Swing Type Slingers 19" head.
4—B & P 8 ton plate feeders.
2—B & P 35 ton capacity plate feeders.
6—B & P Tanks for speed slingers.
1—B&P Motive 15' Jib—6' Ram—19".
1—B&P Motive Jr. 8' Jib—4' Ram—19".

SHAKEOUTS & SCREENS

2—LINK-BELT 5' x 10', 6 ton cap.
3—SIMPLICITY 4' x 6' Model B.
1—SIMPLICITY 4' x 8' Model D.
1—SIMPLICITY 4' x 10' Model D.
1—SIMPLICITY 5' x 8', Model D.
1—NATIONAL ENG. 5' x 8' Hex Screen.
1—HEWITT-ROBINS 36" x 78" Vibrex.
1—SIMPLICITY 4' x 10' Model B, Single deck sifter screen, 10 HP motors.
2—ROBBINS 3' x 4' JF6—2000#.
1—ROBBINS 6' x 10' JF11—20,000#.

SAND BLAST EQUIPMENT

2—AMERICAN 36" continuous Tumblasts
1—AMERICAN 36" x 42", w/skip hoist.
2—AMERICAN 48" x 42", w/skip hoist.
1—AMERICAN 27" x 36", w/skip hoist.
1—AMERICAN 48" x 48", w/skip hoist
1—AMERICAN 48" x 72" w/loader.
1—AMERICAN No. 2 Tablast—6' dia. Plain Table.
1—AMERICAN #3 Tablast, 4—48" tables.
1—PANGBORN Model 6-CF, 6' diameter plain table with dust collector.
1—PANGBORN 6 LG-14 Multi-Table, 6-24" tables, w/dust collector.
1—PANGBORN Model 14GK-7 Roto-Blast barrel w/loader.
1—PANGBORN 9LG-14 Multi-Table w/6—36" dia. Aux. Tables w/Dust Collector.

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AIR COMPRESSORS
Binks 2 Stage, 2 h.p.
CHICAGO Pneumatic 300 h.p. synchronous, 4160V

AERATOR
NEWAYGO

BELTING
29" x 180' 24" x 152'
24" x 263' 24" x 120'

BLOWERS
Ingersoll-Rand 12900 cfm, 100 h.p. 220-440 V, 20 oz.
GE 10500 cfm., 20 oz., 85 h.p., 220 V.
GE 7500 cfm., 20 oz., 89.6 h.p., 220-440 V.
SPENCER 7350 cfm., 16 oz., 50 h.p.
SPENCER 7000 cfm., 32 oz.
GE Centrifugal 6200 cfm., 24 oz., 58 h.p. motor
SPENCER 3500 cfm, 28 oz., 40 h.p.
SPENCER 2250 cfm., 16 oz., 15 h.p., 220 V
SPENCER 1350 cfm, 32 oz.
NORTH AMERICAN 1050 cfm, 16 oz.
NORTH AMERICAN 850 cfm.
McKee 200 cfm.

BUFFERS
STANDARD 20 RSB 20 h.p.

CLEANING EQUIPMENT
Model 4836V-B VAPOR BLAST

CONVEYOR
17' BARBER GREEN Bucket Conveyor
30" x 25' Magnetic Belt Conveyor w/drives, 2 hp. 220-440 V

CONVEYORS OSCILLATING
SIMPLICITY 18" x 24'
SYNTRON 24" x 6'
AJAX 12" x 20'6"

CORE BLOWERS
CB15 55# cores, Universal blow plate
DEMMLER #4 up to 250# cores
DEMMLER #55
DEMMLER 2EO
DEMMLER 2K
FEDERAL "SAN-BLO" CB 4C
INTERNATIONAL SB15H, up to 150# cores, Hydraulic clamp and draw
INTERNATIONAL SB 13, up to 60# cores
6—OSBORN 193 up to 50# cores

CORE GRINDERS
5—MILWAUKEE 70-9 & 70-12s
1—OWOSSO DE1-303 42" table

CORE OVENS
THERMONIC INDUCTION MODEL 1800A
3—DESPATCH ET.

CORE ROLLOVERS
INTERNATIONAL REDP Rollover 12" draw

CRANES
P&H 3 TON Electric Traveling DC motors 50' span
270' Crane Runway and Supports
10 ton MILWAUKEE; 48' span, 220 V.

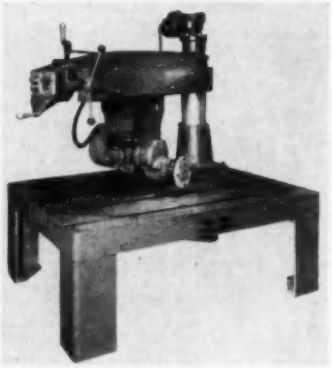
CUPOLA GUNS
1—BONDACTOR #1250

DUST COLLECTORS
PARSONS 40,000 cfm. cloth bag type
ROTOCLONE, Size 6, Wet Type, 3000 cfm
ROTOCLONE W14 Arrang. A, 5200 cfm.

ELECTRIC MELTING FURNACES
1—DETROIT "LFA" 350# shell 13200 V.
1—DETROIT "LFC" 700# and 350# Tapered Shell 2300 V.
FLASK HOIST—ROLLER CONVEYOR

FURNACE TRANSFORMERS
1—"LECTROMELT" 800 KVA, 12000 V. 3 phase
PENNSYLVANIA 750 KVA, 13200 V., single phase
1—WESTINGHOUSE 500 KVA, 11200 V., 3 phase
1—WESTINGHOUSE 2500 KVA, 13800 V., 3 phase

GRINDERS, MISC.
U. S. DOUBLE END SNAG, 20" x 3" Wheel, 15 h.p.
U.S. #70 Combination 20" disc and 20" x 3" x 1¼" wheel
GARDNER 18" single end disc.
HANCHETT 30" double spindle opposed
GARDNER 26" D.E. Disc.
GARDNER 30" D.E. Disc.
STANDARD 24" x 3" wheel Snag, 2-7½ h.p. motors



10—DEWALT CUTOFF SAWS for ferrous or nonferrous metals, cutoff or as sprue cutters. Flush blade adaptor takes up to 20" abrasive blade or saw. Power Hoist to arm. Chain & sprocket cross feed for working on heavy cast iron 48" x 60" "T" slot table or off table cutting of large work. Motor swivels horizontal to vertical in yoke.

GRINDERS, SWING FRAME
FOX 24" x 3" x 12", 15 h.p.
MARSCHKE 24" x 3" x 12" 20 hp., 220 V.
U.S. 24" x 3" x 12" 15 hp., 220-440 V.
2—MARSCHKE 3 hp., 12" wheel
1—B&D 7½ hp.

HEAT TREATING FURNACES
HOLDEN #202 Electrode Type. Bright hardening annealing 1850°

HOISTS
2—4000# Lo Hed, 220/440V
10 ton SHAW BOX electric hoist
4—INGERSOLL-RAND Air trolleys
1—500# INGERSOLL-RAND LC-4
4—CLEVELAND 2000# Cab type hot metal carriers

INDUCTION MELTING EQUIPMENT
100 KW-Ajax 300# 3000 cycle, 150 h.p. 4 bearings MS set, water cooled, complete controls
30 KW Lepel Spark Gap
35 KW Ajax Tama Wyatt, 60 cycle induction holding furnaces
1000# Ajax Spare Melting Furnaces—Unused

LADLE MIXING
4000# Industrial, Insulated

MOLD BLOWER
TACCONE TD4 24" x 32" flask

MOLDING MACHINES
JOLT SQUEEZE PIN LIFT
2—OSBORN 712 PJ 18" x 28" table
1—CHAMPION J8L10P 18" x 21" table 6" draw
8—MILWAUKEE 2646 Jolt Squeeze Strip rolloff — rolling molding machines 10" jolt cylinder; 1800# capacity, 26" Squeeze cylinder; 13" draw. Flask size 25¼" to 29" wide, 52" long. FACTORY REBUILT.
113 PJ SPO

JOLT SQUEEZERS
4—CHAMPION, JS10P 18" x 21" table
2—OSBORN 275PJ
2—MILWAUKEE 244 Jolt Squeeze car type head
MILWAUKEE 181-7, 24" x 36" table

JOLT ROLLOVER DRAWS
HERMAN 10000# late
HERMAN 3000#
2—750# HERMAN 20" x 30" table
1—INTERNATIONAL RJ 20" x 12"
3—SPO 9032

JOLT SQUEEZE ROLLOVER DRAW
2—#331 OSBORN 24" x 30" flask area, 7" draw

JOLT PIN LIFTS
MILWAUKEE 3000#, 38" x 42"
2—INTERNATIONAL 1200-S 26" x 27" table, 8" draw

PLAIN JOLT
40" x 84" Herman
36" x 60" Herman

MULLERS and MIXERS
2—#3 UD Simpson
1—930 Clearfield
1—#1 Simpson Muller
B & P #30 w/skip multrol, also has cooling or heating coils for plastic or shell
CLEARFIELD #404
B&P #80 x #80A

SAND CUTTERS
AMERICAN 51"
JEFFREY SANDITIONER
ROYER NDP, 2 h.p.

SAND SLINGERS
1—B&P Tractor, 19" heads
B&P Stationary Super Hydra, 19" head

SAND SYSTEMS
2—NEWAYGO SUPER HANDY SANDY; like new

SAWS, BAND
30" LAIDLAW, Metal Cutting hydraulic feed
42" TANNEWITZ, 5 hp., 220-440 V.

SHAKEOUTS
3' x 5' SIMPLICITY
5' x 6' SIMPLICITY
3' x 10' SIMPLICITY
7' x 8' SIMPLICITY SOM14

SHELL EQUIPMENT
SHELL PRODUCTS 20" x 30" pattern size w/shell blender and bonding press

SHELL MOLDING
TSM4 Shell Molding Machine 20" x 30"

SHOT BLAST
SLY #4, 20" x 30" w/dust collector

SLAG DISPOSAL UNIT
AMERICAN MODEL A

SPRUE CUTTERS
1—MILWAUKEE #85 TON

STRAIGHTENING PRESS HYDRAULIC
150 ton HPM
150 ton Farquhar "C" Frame
100 ton Watson Stillman "C" Frame
60 ton Lempco 4 post
60 ton Farquhar "C" Frame

TESTING EQUIPMENT
ARLIN Automatic Rockwell, continuous type
60,000# BALDWIN SOUTHWARK Tensile Tester
COLEMAN 55 Spectrophotometer
GOGAN Model 1414-2V
TYLER ROTAP Testing Sieve w/screens
TINIUS OLSON Brinnel Hardness Tester Production Bench

TUMBLING BARRELS
1—ROYERSFORD, 42" x 72", chain drive, late
SLY, 24" x 48"; 3 H.P.
SLY, 30" x 60" Duplex.

WHEELABRATORS
27" x 36" American w/skip
2—20" x 27" AMERICAN, w/rubber belt
1—42" x 48" AMERICAN Skip Loader.
AMERICAN #2 Tablast 8-28" tables, late
PANGBORN LD1-Airblast Table
PANGBORN GD1-Airblast Barrel

WOODWORKING—PATTERNSHOP
GARDNER 30" DISC and Spindle Sander
HERMANCE 24" Planer
JONES SUPERIOR 48" Double Disc
BOICE CRANE 12" Planer
OLIVER #290 Dbl Arbor, Tilt-Arbor Saw
1—OLIVER 182D, 15" Disc Sanders
WALLACE 8" Jointer
CRESCENT 24" Planer
TANNEWITZ 42" Band Saw
ONSRUD W-244 & W-240 Routers
8", 12" and 30" Jointers
16", 32", 36" Band Saws

WIRE STRAIGHTENERS
1—#2A Climax ¼"
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PHONES TREMONT 1-2088 AND 9-6170

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FOR SALE

1—Simpson #0 Muller—Style M (never used)
1—Simpson 18" Muller
1—Lancaster Mixer, Model EBG-4
1—Lancaster Mixer, Model EAG-3
3—Link Belt Roto Louver Rotary Dryers, Models 207-10, 310-16 and 604-20.

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CORE BLOWERS—rebuilt and guaranteed
2—Demmler model #55
1—Taccone bench type, horizontal or vertical clamping.

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14919 SARANAC ROAD **CLEVELAND 10, OHIO**

WHEELABRATORS
1—20" x 27", 2 cu. ft. Tumblast
1—42" x 48", 17½ cu. ft. Tumblast with loader
1—6' Table Airblast w/six aux. tables
1—6' Table Pangborn LF.

MOLDING MACHINES (Automatic)
2—TDA4 Taccones

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COMPLETE FOUNDRIES,
SMALL/LARGE.
PROMPT SERVICE.

CORE OVEN
1—Di-Electric, Model CD-25 Coleman, 30 KW.
2—8 Drawer, oil fired, auto control.

SWING GRINDERS
10—10 H.P. Mummert-Dixon Model 1814

ELECTRIC FURNACE
1—Ajax—Tama Wyatt, 300 lbs. aluminum per hr., 60 KW, 100 KVA, 460v, 1 ph., 60 cy.
1—Heat-Treat, Lindberg, 72 x 84 x 96, car type, 105 KW, 220v, 3 ph., 1250°F.
1—350 lbs. Detroit Rocking

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Circle 873 on Page 53

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JOLT SQUEEZERS
International PJS-16"
International LJS-10"
Osborn 275JW and 275J
SPO 110J
Tabor Top Squeezers
Tabor Strand Rod
JOLT SQUEEZE ROLLOVER DRAW
SPO 920
SPO 413D
Osborn 332
JOLT ROLLOVER DRAW
International F
International G 30 x 12
SPO 508
Tabor 30 x 50
Tabor 16 x 22
Osborn 242W
Herman 40 x 60—10,000 #
JOLT PIN LIFT
Davenport 34A
Osborn 539
Milwaukee 1536
JOLT SQUEEZE PIN LIFT
Osborn 716PJ
Osborn 712PJ
Milwaukee 126

MULLERS
H&P 60—Multrolmatic
Simpson #3 with skip hoist
Simpson #2 Skip & Aerator
AIRLESS BLAST EQUIPMENT
Wheelabrator 48 x 72 with skip and dust collector, excellent condition.
Wheelabrator 27 x 36 with skip.
Wheelabrator 42 x 48 with skip & collector
Wheelabrator 36 x 42 with skip & collector
Pangborn #3 continuous with feeder & collector
Pangborn 8LF Plain Table
CORE BLOWERS
Demmler 103EO, skip, feeder & automatic cycle
Demmler 3EO, feeder & semi-automatic cycle
Demmler #1 and 2, #55 and 2K
San Bio CB-40-D-LPP
Redford #1 & 2
Champion CB-8 and CB-15 and CB-18 (Never used.)
CORE OVENS
Coleman 39" tower combination oil & gas
Parbeck double end gas or oil
SAND CONDITIONING AND HANDLING
Screenarators "M" & "L"
Royer NDP
American Sand Cutters — various sizes.
Bucket Elevators
Troughing Conveyor 16" x 34' w or w/o magnetic pulley.
Oscillating Conveyor 24" x 30' year 1956.
B & P No. 60 Preparator
MATERIAL HANDLING
Hough HA Payloaders
Forklift Trucks and Handling Boxes
1 Yard Clamshell Bucket
1½ Yard D.C. Clamshell Bucket
Hoists Air and Electric
Crane Magnets 39", 45", 50" and 55"

METAL HANDLING
Ladles 250 # —10,000 #
Pouring Devices, various capacities
Motorized Ladle Carrier
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AIR COMPRESSORS
10, 15 & 40 hp water cooled
175 hp synchronous, 2 stage IR-XRE
MISCELLANEOUS EQUIPMENT
Foxboro Air Weight Controllers
Grinders, 18" x 24"
Detroit Hardness Testers
Flasks, Steel, various sizes
Flasks, Aluminum Slip
Jackets, Aluminum & Wopper Jaw
Core Plates—Aluminum & Trensite
1½ Yard DC Clamshell Bucket
Cupolas, 1½, 2½, 5, 6, 7, 8, 9 and 10
American Core Rod Straightener
42" Bullard "New Area" VTL lathe with side head
52" Betts Boring Mill with two loading arms.
American Radial Drill 7' arm, 16" column.

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WANTED! GOOD SURPLUS EQUIPMENT

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6'8" x 8'2"
2—25 ton Ladles
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Core Blower—Sand Blo—used very little, in good condition.
COLUMBIANA FOUNDRY COMPANY

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FOR SALE

MELTING FURNACES
$200.00 each—F.O.B. Arkansas
Dimensions: Outside — 34½" diameter x 35" deep
Inside — 21½" diameter x 31" deep
Units complete including lining, thermocouple and protection tube, Hauck #780 Proportioned burner assembly—Burner, oil pressure regulator, oil filter, oil pressure gage, micro-regulating valve, oil shut off valve, air shut off valve.
Manufacturer—Hausfeld.
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SIMPSON 1½ Sand Mill
6 cubic foot capacity; fully equipped with Bucket Loader—Aerator—Dust Hood
Excellent Condition
BOX 219, FOUNDRY
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SHALLOW DEEP EXTRA DEEP

CONCAVE RECESSED CO_2

Slotted core box vents for every purpose. Inserting drill (right) ideal for inserting core vents. Special cleaning tool saves time.

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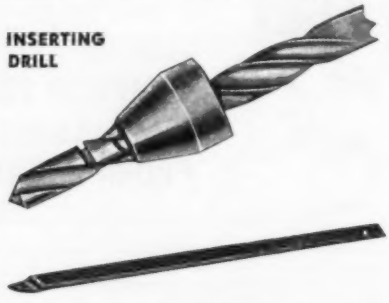

INSERTING DRILL

CLEANING TOOL

Circle 715 on Page 53

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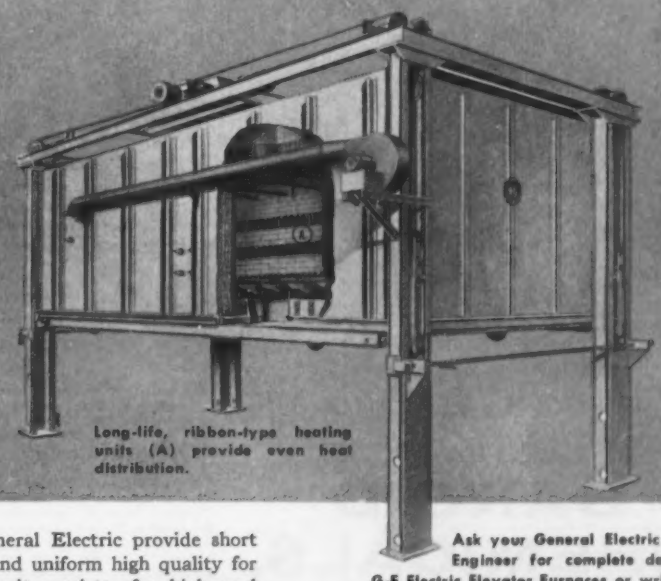
from General Electric

for batch annealing of standard and pearlitic malleable iron



Long-life, ribbon-type heating units (A) provide even heat distribution.

Electric Elevator Furnaces from General Electric provide short production cycles, lower operating costs, and uniform high quality for your malleable iron annealing. Complete unit consists of a high- and a low-temperature furnace. A self-generating protective gas or controlled atmosphere is used—instead of sand—to protect parts, thus reducing time cycle and heat input. Uniform heat distribution and accurate temperature control assure a proper annealing cycle for all pieces. The elevated design gives you extra floor space. And longer operating life results because elevator lift eases loaded cars into place without jarring.

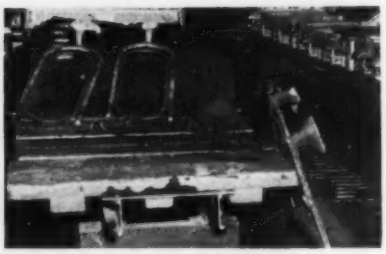
Ask your General Electric Sales Engineer for complete data on G-E Electric Elevator Furnaces or write for bulletin GED-3991. General Electric Company, Schenectady 5, N. Y.

721-29

Progress Is Our Most Important Product

GENERAL ELECTRIC

ATTWOOD BRASS WORKS, Grand Rapids, Michigan, find that PETRO BOND molding sands shake out clean and fast. One example is this job of 24" marine port lights cast from aluminum in 4/4 pop-off flasks.



PETRO BOND*

for smoother surfaces with less clean-up time

Fine finish castings are a standard result when your foundry sands are bonded with PETRO BOND. The smooth surface eliminates extra buffing; tolerances are closer.

You get finer results and fewer rejects when bonding with PETRO BOND, because sands are bonded with oil instead of water. This means you can use fine-grain sands, with less gas in the mold. Sands shake out fast, don't stick to castings.

ATTWOOD BRASS WORKS, Grand Rapids, Michigan, cast these marine bow plates from manganese bronze, using PETRO BOND sand molds. They report fewer rejects since using PETRO BOND.

Write today for BOOKLET giving further information on the benefits gained by using PETRO BOND by BAROID.

BAROID

BAROID CHEMICALS, INC.

A SUBSIDIARY OF NATIONAL LEAD COMPANY
1809 SOUTH COAST LIFE BLDG. HOUSTON 2, TEXAS

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6018

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NEW EQUIPMENT DIGEST • AUTOMATION

FOUNDRY is edited primarily for management, production, technical and purchasing personnel in foundries. A copy is sent at no cost to each metal casting plant in the U. S. and Canada employing 20 or more workers and to selected smaller foundries. Additional copies are sent to each foundry to the extent necessary to serve key foundry personnel on an individual or routed basis. A limited number of copies is supplied at no cost to educational institutions.
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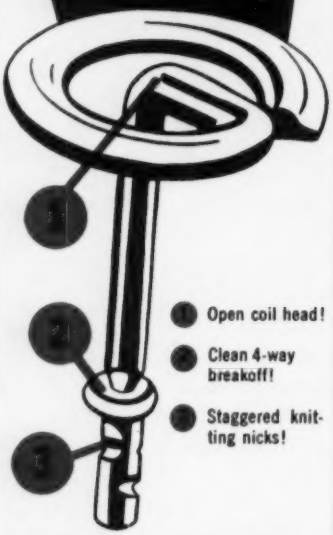

1 Open coil head!
2 Clean 4-way breakoff!
3 Staggered knitting nicks!

keep casting quality **HIGH!**
improve production and **SAVE MONEY!**

These sturdy open coil head chaplets make precision casting easier because they pack firmer . . . hold core position.

They leave no voids . . . and finally, they break off cleaner. What's more, they cost no more than ordinary plate heads.

Handy chaplet guide! Ask for new Chaplet Catalog Today.

THE **Cleveland**
CHAPLET & MFG. CO.
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GRINDERS BUFFERS

PRECISION TOOLS TO ASSURE EVERY AND ANY GRINDING OPERATION TO BE SATISFACTORY
. . faster . . easier . .

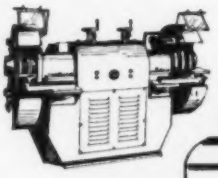
"Over 60 Years Service to Industry"

General Purpose Grinder

Totally enclosed motor, 1 to 5 hp. Push button starter with overload protection. Enclosed ball bearings. Enclosed adjustable wheel guards.

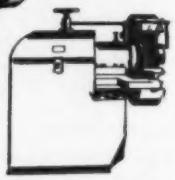
Swing Frame Grinder

Perfect balance, light, flexible, lateral or rotating. Perfect visibility. Single suspension at center. Angular adjustment.



Dual Motor Vari-Speed Grinder

Constant peripheral speed regardless of wheel diameter for longer wheel life. Maximum speed for entire life of wheel.



Vari-Speed Single End Grinder

WRITE FOR CATALOGS

The United States Electrical Tool Co.
3640 LLEWELLYN ST., CINCINNATI 23, OHIO

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Advertisement

How Can You Economize on Machine Tool Costs?

A serious problem faced by today's machine shops, large and small, is costs. Knowledge of newer methods and techniques becomes all-important

Lack of basic machine tool knowledge is hitting where it hurts most: in the pocketbook. Established, time-honored methods of machining, and old standby tool steel compositions are passing out. *Foremen or plant superintendents are the men who can make or break a machine shop economically.* This is true not only in the all-important missiles field, but also in the every day machining problems that come up.

Detailed Specific Knowledge Is Often Lacking

Like a doctor who never stops learning about new techniques, new serums and antibiotics, so a plant foreman, superintendent, or even the machinist himself must keep abreast of the fast-changing technology in metals and machining of metals. What was true yesterday may not be true today.

Detailed knowledge of the principles and practices of machining, tool steel selection, cutting speeds, lubricants, etc., is invaluable to the plant owner. The remarkable fact is that so many owners have not kept up with even the basic changes in the metal-cutting industry. For instance, there is a definite relationship between cutting speed and tool life. Precise knowledge of the condition of the metals to be machined and the capacity of the tool to do the job might determine 1) whether the job can be speeded up without the expense of using more cutting tools or 2) whether the job should be slowed down for accuracy at the expense of labor and lost machine time. Specific knowledge might spell the difference between profit and loss on this job.

Many short-lived cutting tools are expensive. Is it worth the money to use higher grade tools? Is the down-time of the machine more costly? Does the total job warrant it? Knowledge of the precise relationship between tool cost, down-time and labor may be the difference between profit and loss.

Importance of Tool Knowledge to Foremen and Machinist: How This Knowledge Effects the Economic Picture of Foreman, Machinist and Plant Owner.

Many shops base payment schedules for foremen on the overall efficiency of the shop. Machinists are often paid on a piece basis. Obviously, then, both foreman and machinist stand to gain from the specific knowledge of tool cost, tool life, warpage, cutting speeds, effects of heat treatment, internal stresses and related items.

American Society for Metals Notes Need for Information

Aware that this particular field is not satisfactorily covered in articles and books, and doubly aware of how important it is to large and small shops to be able to get these facts in understandable form, the ASM has directed its educational division, Metals Engineering Institute, to add a new course to its twenty-three home-study and extension studies. The new course is Principles of Machining.

Written by William R. Backer, MS., machine research engineer for the Norton Co., of Worcester, Massachusetts, the course covers the following 15 separate lessons: The Machine Tool; What Happens When Metal Is Cut; Effects of the Cutting Process; Cutting Tools; Force, Work and Power in Machining; Tool Life-measurement and Control; Machinability of Metals; Machinability Versus Microstructure; The Economics of Machining; Cutting Fluids; Surface Quality; Turning; Milling; Drilling; Grinding.

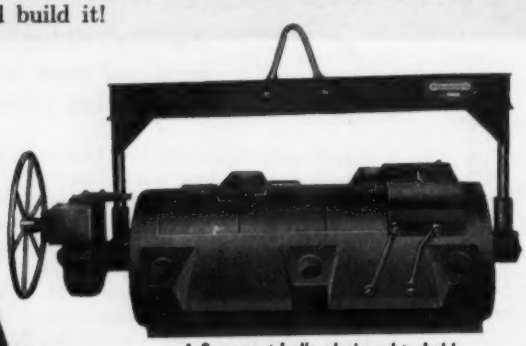
This new Machining Course is only one of 24 home-study courses currently being offered by The Metals Engineering Institute. Specific information on the Machining course or on any of the others may be had by writing Metals Engineering Institute, Dept. F. Metals Park, Novelty, Ohio, or by contacting your local ASM Chapter.

LADLES UNLIMITED

Wherever metal is treated, inoculated, distributed or poured — MECHANICALLY — the chances are good that the ladle equipment is MODERN! Ladles in all types and sizes are engineered to the metal loads and pouring conditions. There are no size limitations: You name it! We'll build it!

Modern 17½" top diameter, tapered, covered ladle with No. 1 type shank, roller bearing trunnions and detachable bail.

800 pound, straight-sided ladle with square bail and gearing. Seven standard gear sizes are available for ladles to serve the expanding range of tilting needs.



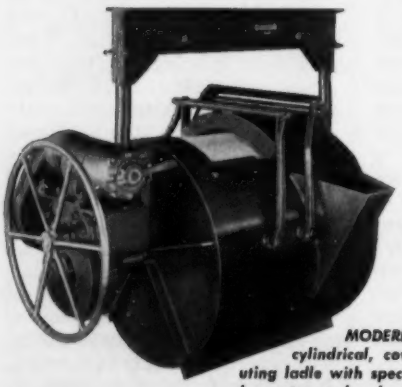
A five-spout ladle, designed to hold 1500 pounds, pours from either side.

Pete—
I believe we should order a couple new ladles now! See me!
B.K.

82" diameter ladle having 50,000 pounds metal capacity and built to steel mill specifications.

Obround mixing ladle of 36,000 pounds metal capacity.

Ask for CATALOG P-152-A



MODERN 2000 pound cylindrical, covered, distributing ladle with special bail. Tilted by motor or hand wheel.

Special inoculation ladle on transfer car. Ladle bowl is detachable.

MODERN

MODERN EQUIPMENT COMPANY

PORT WASHINGTON, WISCONSIN

Dept. F-3

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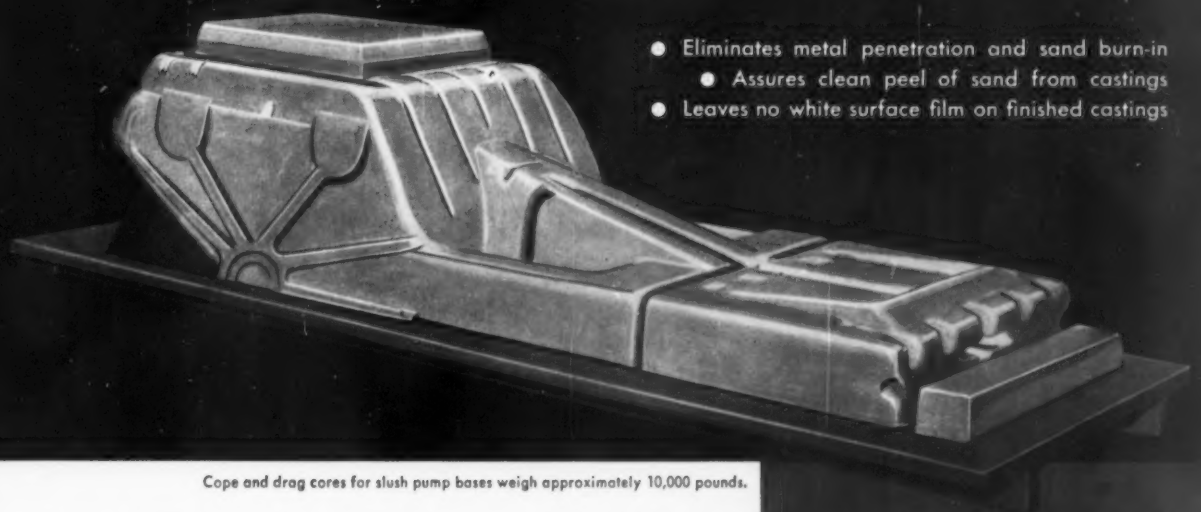
STEVENS GRAPH-Z CORE WASH

CUTS CLEANING ROOM COSTS AT GARDNER-DENVER

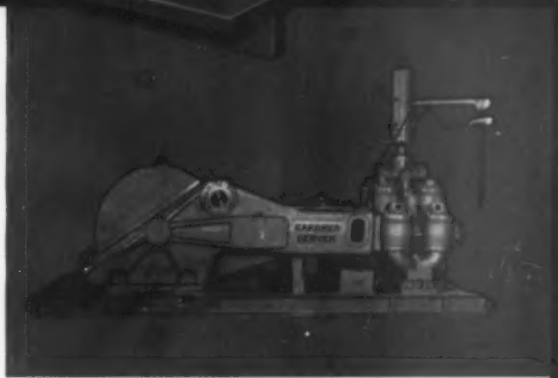
- Eliminates metal penetration and sand burn-in
- Assures clean peel of sand from castings
- Leaves no white surface film on finished castings



Cope and drag cores for slush pump bases weigh approximately 10,000 pounds.

The Gardner-Denver Company, world-renowned manufacturer of oil field equipment, depends on Stevens Graph-Z Core Wash to produce smooth, clean castings for its famous deep-drilling slush pumps. The result: better castings that require fewer cleaning-room operations prior to final finishing!

Write today for information on Stevens complete line of core washes and other foundry products. Or, contact your Stevens representative . . . he'll show you how you, too, can produce better, cleaner castings and reduce overall foundry costs!



Gardner-Denver Model GXP Deep-drilling Slush Pump.

EVERYTHING FOR THE FOUNDRY

frederic b. STEVENS, inc.

DETROIT 16, MICH.

BUFFALO CHICAGO DETROIT CLEVELAND
INDIANAPOLIS MILWAUKEE NEW HAVEN SPRINGFIELD (OHIO)

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Dept. F-3

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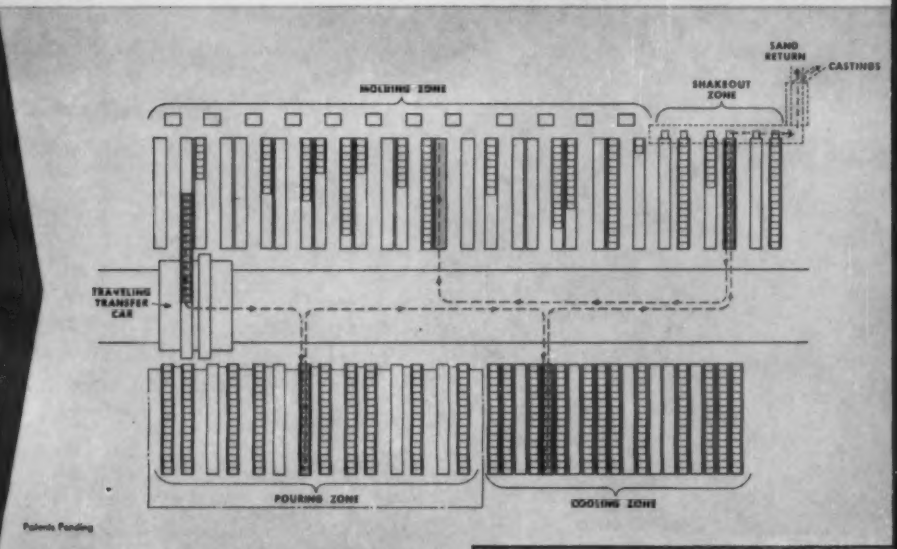
new

BARTLETT B-SNOW

CLEVELAND 5, OHIO

General View Showing Group of Unpoured Molds Being Loaded onto the Transfer Car.

"MF" mold handling system



Patents Pending

provides maximum flexibility in molding, pouring, cooling and shaking-out any size or type of ferrous or non-ferrous mold.

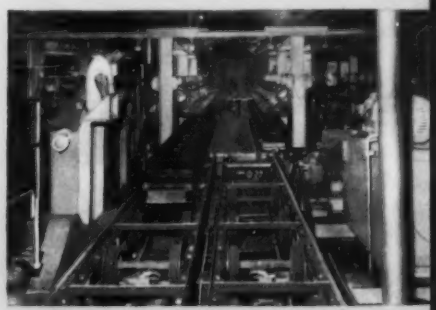
MANY ADVANTAGES

1. Molding, pouring, cooling and shakeout are centralized.
2. Maximum production is obtained from available floor area.
3. Snap and tight flask molds of different sizes can be set out as rapidly as they are made.
4. There is no waiting for set-out space.
5. Slow jobs do not hold up fast jobs.
6. Cooling time can be long or short depending upon the size and type of casting.
7. Sand handling facilities are minimized.
8. Pouring zone is located close to the melting area.
9. Weight and jacket handling are greatly reduced.
10. Ventilation is simplified. Fewer pits are required.
11. High production is obtained with less equipment and less manpower.
12. Handling similar molds together permits pouring different groups with metals of different analysis.

●For more information about this and other modern, cost reducing ideas, telephone your nearest Bartlett-Snow representative.

OPERATION

The RED ARROWS in the diagram above show a typical path of a group of molds on a roller-top pallet as they are moved through a complete cycle by a single operator with a transfer car.



Close-up View Showing Group of Poured Molds Being Loaded onto the Transfer Car.

THE C. O. BARTLETT & SNOW COMPANY

Designers, Engineers, Fabricators and Erectors of Foundry Equipment

HOME OFFICE—CLEVELAND 5, OHIO • NEW YORK • CHICAGO • DETROIT • BUFFALO • PHILADELPHIA